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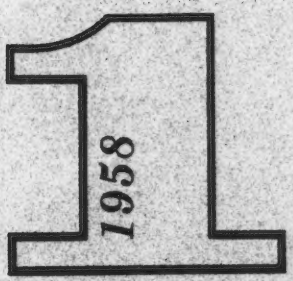

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CURATOR

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Correlation of Museum Positions and Standards

CARL E. GUTHE, RESEARCH ASSOCIATE
THE AMERICAN ASSOCIATION OF MUSEUMS

Throughout this annual meeting we have heard much about museum standards. It is evident that standards may take many forms. They may be established for such aspects of museum work as collection evaluation, recording methods, exhibit techniques, educational activities, membership services, managerial procedures, and trustee-staff relations.

As I understand it, the term "standard," as used in this connection, is a shorthand expression for a group of graded criteria which constitutes a more or less ideal measure, or yardstick, by means of which an object, an achievement, an activity or an individual may be evaluated. Actually, standards in museum work already exist, for each museum worker uses standards of his own creation to evaluate the success with which he has performed his several tasks. However, the individual elements of these personal standards vary so greatly that they tend to obscure those elements which are generally applicable to work in most museums. When we speak generically of museum standards, we envision a number of codified criteria for evaluating various phases of museum work which have been so carefully formulated that they will be accepted and followed by the majority of museum workers.

I submit, however, that generally accepted museum standards will influence the growth of the museum movement only in so far as individual staff members are capable of appreciating their significance and of applying them to the work in their own museums. I hold it is vitally

(EDITOR'S NOTE: Dr. Guthe delivered this speech in May, 1957, before the Education Section of The American Association of Museums.)

necessary to formulate a group of criteria by which the usefulness of individual staff members may be evaluated. The subject of standards of professional competence in museum work is one which has been puzzling me for some time.

We all like to think of ourselves as professional museum workers. Yet just what does the word "professional" mean? A professional is one who has spent a great deal of time and energy learning to perform certain specialized activities in a completely competent manner. Professional athletes, artists, teachers, librarians and nurses are respected and command salaries in accordance with their achievements and the professional competence of their performances. Many museum workers are professionally competent. The majority of these have attained this status not by meeting certain standards, but by using their abilities in interpreting the lessons taught in the hard school of experience. In contrast to the professional, an amateur is a self-trained individual, often unaware of the high standards set by professionals, who performs his activities because he enjoys them.

The standards observed in the majority of the several hundred small museums I have visited do not, by any means, measure up to those practiced by the larger museums run by professional museum workers. In fact, many of the small museums are so poorly managed that they constitute a detriment to the museum movement. Yet the staff members of most of these are hard-working individuals dedicated to making their museum a respected community institution. In my opinion, this unfortunate situation derives from the fact that the general public, members of the boards of trustees, and the staff members themselves have not been encouraged to distinguish between amateur and professional performance. The fault lies with the museum movement itself which has, so far, failed to codify and distribute acceptable standards of professional competence in museum work.

The creation of practical standards of professional competence in museum work is not a simple task. A great deal of spadework needs to be done, and a mass of detailed information collected. Three great groups of basic data must be recognized, assembled and correlated. In the first place, a moment's thought reveals that a staff member may be a competent curator but incompetent as an exhibit designer or in educational work. This indicates that the various museum positions must be classified into major and minor categories in terms of the nature and complexity of their duties and responsibilities. This inevitably raises the second major consideration. Because the duties and responsibilities of various museum positions differ, it becomes necessary to work out different qualifications in the training, experience and ability required of candidates for these positions. And finally, my experience has convinced me

that the duties of specific staff positions in small museums are not the same as those in the large museums. A formula correlating staff positions in museums of different sizes must ultimately be worked out. All three of these major considerations need to be carefully studied and wisely analyzed before standards of professional competence can be formulated.

Difficulties are immediately encountered in an effort to define the duties and responsibilities of a museum position. Each museum has established a practical system of distribution of duties among its staff members, and has assigned appropriate staff titles. Yet when the practices in several museums are compared, contradictions, differences of opinion and uncertainties immediately arise. What are the distinguishing duties of an administrative curator, a research curator, a curator, and a junior curator? What are the primary responsibilities and duties of an assistant director, a registrar, a curator, a preparator or conservator, and an education supervisor? It seems to me that the only practical solution of this confusion is to have a responsible committee undertake a survey among large and small museums, asking for job analyses—that is, time studies of the actual activities currently performed in each of the museums by the incumbents of the several positions being studied.

Once the onerous job of assembling, analyzing and organizing the mass of data obtained from job time studies is well under way, it will be evident that the minimum requirements, in training, experience and ability, for appointment to the several positions studied cannot be uniform. An administrator should have some knowledge of business practices, personnel management and public relations methods. A research curator should have a Ph.D. in a subject matter field. An artist or preparator should be trained in arts and crafts. A member of the education staff should probably possess a teacher's certificate. It is necessary to establish a formula which will correlate certain qualifications with categories of museum positions, assigning differing degrees of training and experience to positions in accordance with the amount of responsibility carried by each. On the basis of the nature of the tasks performed, the professional museum positions could be grouped under four major categories: administrative, curatorial, technical and educational.

When the several museum positions have been defined according to duties, responsibilities, and minimum qualifications of potential candidates, and classified into categories, it then becomes necessary to determine position equivalencies in terms of status within the organization and salary potential. For example, does the position of education supervisor, requiring graduation from a teacher's college and four years of museum experience, have the same status and salary potential as that of curator, requiring a master's degree in a subject matter field and two years of museum experience? I decline to answer the question here

because it may incriminate me. But it does illustrate the type of decision which must be made before relative ratings of museum positions and titles can be established. The creation of these equivalencies requires careful study and sound judgment.

The analogous problem of establishing equivalencies between staff positions and titles in small museums and those in larger museums presents additional difficulties. In a small museum a single staff member may perform the duties and responsibilities of several staff members of a larger museum, thereby holding a position which requires wider and less detailed knowledge and more diverse abilities. Staff positions and titles in small museums need to be evaluated differently from, but also correlated with, those in the larger museums. Valid standards of professional competence in museum work will require that staff positions with analogous duties and responsibilities and similar minimum qualifications of candidates be assigned equivalent ratings in organizational status and salary potential.

The procedure I have outlined approximates that followed by the state and municipal civil service organizations with which I am familiar. Years of study and experience have led to the belief that competence of performance and equitable compensation can best be attained by the use of job specifications for individual classes of positions, in which definite minimum qualifications of candidates are correlated with detailed statements of duties and responsibilities, weighted in accordance with the size of the organization in which the position occurs.

There are precedents for this approach to the study of standards of competence. In 1949 the Committee on Professional Education of the American Public Health Association appointed a special subcommittee to survey and study the present and potential future use of non-medical administrative personnel in public health agencies. A report, issued late in 1951, shows that each member of this large subcommittee made a special study in his own field of the types, numbers, functions and potential roles of non-medical administrators. This information was correlated with the results of a time study conducted concurrently by the U.S. Public Health Service, in which medical administrators reported time spent in each of their activities for a one week period, and indicated whether or not in their opinion the activity reported involved medical judgment. It was found that the agencies and areas in which non-medical administrative personnel serve were manifold, and the job titles for apparently similar duties varied to some extent even within certain fields. The subcommittee set up ten categories of non-medical administrative positions, listed four qualifications for top level positions, and four prerequisites for promotional progress through the administrative levels.

The National Commission on Teacher Education and Professional Standards of the National Education Association has been studying this complex subject for a number of years. In 1954 it issued a report on "Factors in Teaching Competence," classified under the several roles a teacher plays as a director of learning, a counselor and guidance worker, a member of the school community, a mediator of the culture, a link with the community, and a member of the profession. In 1956 this Commission published statements of policy relating to selection of prospective teachers, certification, salaries, teacher load, professional working conditions, and in-service growth, including recommendations of standards listing eight criteria to govern teacher load, and twelve criteria for professional working conditions.

By far the most useful precedent for use in the study of museum standards is the report entitled "Classification and Pay Plans for Municipal Public Libraries," derived from studies made by the Board on Salaries, Staff and Tenure of the American Library Association, which was published in 1939.

A paragraph in the foreword of this report is so pertinent that I quote it in full.

> By developing recommended classification and pay plans for municipal public libraries, the American Library Association has met one of its professional responsibilities. It is natural that every professional group should be interested in raising and maintaining personnel standards in its field. The soundest approach to this problem is through the development of a classification plan by which positions in the profession are classified on the basis of their duties and responsibilities. This method clearly recognizes that there are different kinds and levels of work and competence in the profession, rather than a single minimum level applicable to all positions in the occupation. In adopting this method for improving personnel standards, the library profession has effectively placed itself among the leading professions of the country. Too frequently, members of other professional groups have neither recognized their responsibilities for achieving sound public personnel administration nor become aware of the means that might be used in discharging those responsibilities. It is hoped that the classification and pay plans developed by the American Library Association Board on Salaries, Staff and Tenure will encourage other groups to take similar active interest in the development of professional standards in their respective fields.

Five hundred copies of the first tentative draft of this report were distributed in November 1937 to librarians of public libraries, state library extension agencies, state library associations and library schools. A greatly expanded second draft was sent in March 1938 to the same groups, to the ALA Council, and to members of certain interested boards and committees. At the annual Conference in June 1938, an open meeting to discuss the plans was held. To this meeting were invited repre-

sentatives of staff associations and junior members organizations, as well as the other groups already mentioned. During the summer of 1938, group conferences of members of the Board were held. The report was adopted by the ALA Council in December of 1938, after thirteen months of intensive and cooperative study.

Time does not permit a detailed discussion of this interesting report. Briefly, however, the report establishes eleven classes of municipal public libraries. The principal criterion is the size of the community. Other criteria are the size and professional standing of the staff, the budget calculated on a per capita allowance for the community population, the numbers of books in the collections, the book circulation, the percentage of the population registered as borrowers, and the number of hours open a week.

The report then defines three grades of clerical service, two grades of subprofessional service and ten grades of professional service, in terms of general academic training, library school training and experience. In this connection, two years of library experience are equated with one year of training in a library school. In the five top grades it is stipulated that "personal qualifications and proved ability should always outweigh number of years of experience."

Under each grade of librarian are listed the positions to which that grade is eligible. For example, a professional grade 4 librarian may be Chief Librarian in a Class 5 library, Assistant Chief Librarian in a Class 7 library, or Assistant Librarian in a variety of specialized categories. In this way the several grades of librarians are correlated with the several classes of libraries. The report also includes salaries, which are now obsolete, for each grade. Appended to the report proper are formal specifications for library position titles, which closely resemble civil service job specifications.

I am personally convinced that this achievement by the American Library Association presents a practical and logical approach to the study of standards of professional competence in museum work. Some time ago I worked out a preliminary adaptation of this procedure to museums and submitted it to some members of the American Association of Museums' Committee on Standards, as a possible basis for further study and development.

I suggested the creation of five classes of museums, based upon the number and character of the staff positions and the size of the annual operating budget. I also suggested twelve grades of museum workers, in terms of five levels of academic achievement correlated with the number of years of museum experience. The levels of academic achievement are expressed in terms of alternative training, such as would be required for the major categories of museum work—administrative, curatorial,

technical and educational. Finally, a table was developed correlating the grades of museum workers with staff titles and salaries in the five classes of museums. I used as salary illustrations the current schedules of the Federal Civil Service.

I am fully aware that I am addressing the Education Section of the Association. The subject of standards is not one which is the unique concern of this section. It applies with equal force to all aspects of museum work. I have chosen, therefore, to present my argument in general terms. I am not qualified to discuss authoritatively the nature of the duties of the museum educational staff, nor the qualifications which such staff members should have. Other speakers on this program will treat of these subjects. I feel strongly, however, that in the field of museum educational work, standards governing the various educational activities will not be fully accepted until the educational staff itself has met the requirements of recognized standards of competence.

It seems obvious to me that the first step which must be taken is to determine, through time studies of positions in a number of large and small museums, just what the duties and obligations are for the several classes of educational positions, ranging from docent to education director. Once these data have been assembled and organized by a responsible committee, it will then be possible to work out the minimum qualifications which should be required of candidates for each class of position, and thereby establish what civil service groups call "job specifications." This appears to be the simplest way, in spite of the amount of work and effort involved, of achieving practical standards of professional competence in museum educational work. It is a time-consuming project for museum educators. Yet it is a task which only museum workers can perform.

Please grant me another moment to comment upon the subject of training for museum work. I should like to paraphrase a statement made in the report of the Subcommittee of the Committee on Professional Education of the American Public Health Association by substituting the concept of museums for that of public health. It would seem logical that in· institutions with multiple resources—such as a college or university closely associated, either geographically or administratively, with an operating museum—the program for the training of museum workers would be built upon what already exists in these various areas by way of a qualified faculty, library and reference materials, and established relationships with operating museum programs. There are great advantages in obtaining the required training in a university that has immediate access to and cooperative assistance from the staff of the associated museum, and the faculties of fine arts, natural sciences, social sciences, education, and business and public administration.

However, adequate training schools will not be organized until museum workers have adopted realistic standards of professional competence in museum work which will indicate to the training schools the kind of instruction which must be given students to qualify them for museum positions. These standards need to be sufficiently high to justify a professional type of training and a professional status for museum workers after graduation.

Systematics and Museums

A. E. PARR, DIRECTOR

THE AMERICAN MUSEUM OF NATURAL HISTORY

It can, perhaps, fairly be said that the origin of natural history museums sprang from an urge, which soon became a need, to create a body of knowledge about the world around us, made usable by a systematic organization of the information it contained. In the beginning systematic research exercised a virtual monopoly over the use of the scientific means and talents of the natural history museums. And it is still a fairly common assumption that the study of systematics remains a *sine qua non* of museum existence. But the educational needs of the world have changed, and a re-examination of traditional assumptions may be in order.

As our knowledge of the relationships and past history of the forms of life grew, a need to know and to understand more about the contemporary ways of life grew even faster. In the educational functions of the museums, expressed through the medium of their exhibits, the first break in the monopoly of systematics came with the habitat group. The message of these exhibits is no longer exclusively, or even chiefly, concerned with the identity and classification of the animals shown. Rather do they try to convey an understanding of the living relationships of the animals to each other and to their environment, and to illustrate aspects of their behavior, even though it be in static presentation. A knowledge of ecology and of animal behavior became as important as a knowledge of systematics in order to insure correct performance of the museum's educational tasks.

The new phase of the museum's educational exhibition program has undergone a tremendous growth and development since its first inauguration in the habitat group, at the same time as straight systematic exhibits have failed to maintain their own progress and have generally suffered decline and neglect, both relatively and often also absolutely, except in the subject of paleontology. That this development was not fortuitous or

merely due to caprice within the museum's own organization seems obvious. It was a genuine response to new educational needs and changing directions of public curiosity, and was therefore inevitable.

At first, the change in emphasis was accomplished by a broadening of the fields of study of curators primarily engaged for their qualifications in systematic research. But, as the body of knowledge in each of the several disciplines grew, and the methods became more refined and complex, it also became increasingly difficult to find scientists with universal qualifications in the study of all the aspects of animal form and animal life involved in the educational scope of a modern museum program. Curatorial appointments based upon primary qualifications in ecological research or in the study of animal behavior have become commonplace, with systematic knowledge only a secondary consideration. What, then, is the status, province and need for systematic research in the natural history museums of today?

With the role of systematic research in the educational and exhibition program greatly reduced by comparison with what it once was, except, perhaps, in paleontology, there remains to be considered the problems of the scientific collections, as distinct from the problems of the museum's public functions.

It has recently been suggested in entomological circles that it might be practical and desirable to establish centralized repositories for scientific collections in the charge of a caretaking staff that would not itself engage in research, but would merely maintain and manage the material in the manner of a reference or lending library for others. A general committee of systematists has found this proposal too new to permit a well-balanced evaluation (although it is quite old to most museum administrators), but has not rejected it as an impossibility, and has suggested that a beginning might be made with insect collections.

In considering such a proposal, we must bear in mind that if it should be possible to carry it out at some remote and isolated spot, it would be equally possible to apply the same principles to the care of scientific collections in the metropolitan institutions of New York, London, or Paris. This might, for many museums, actually be said to be only a return to their originally stated purposes of maintaining collections for the encouragement of the study of nature by others, such as those engaged in university teaching, without envisioning a need, or declaring an intent to employ research scientists on the museum's own staff.

The writer does not in any way subscribe to this proposal. On the contrary, I consider it utterly impractical to assume that scientific collections can be cared for in a responsible manner without the constant supervision of scientists keeping their own knowledge of systematics alive by conducting their own systematic research. But, when responsible sys-

tematists can propose such a solution, or even consider it within the realm of possibility, it becomes the duty of every administrator to examine the proposition for any light it may shed on the proper evaluation of the role of systematics in a museum's functions, even though the proposal itself must be rejected.

There is probably no museum director in the world who can say with conviction that his institution has all the scientific talents it requires to meet its demonstrable needs in a really adequate fashion, much less what it would wish to have for the ideal realization of its potentialities. The most difficult task of the museum administrator is therefore to attempt to keep a fluid balance between the conflicting needs for scientists of different persuasions, without ever being able to satisfy any of the needs completely. As long as this condition persists, and it probably always will, all decisions must be based upon needs rather than wishes. Under the circumstances, no museum administrator can fail to be grateful when the students of one of the disciplines involved in his dilemma choose to relieve the pressure by volunteering a suggestion that one of the museum functions traditionally assumed to require their professional services might possibly be carried on without them. Even if the suggestion cannot be accepted at face value, it may certainly be taken to imply that the demonstrable need for systematic research in our natural history museums may be greatly overrated in our current thinking. In the face of a still rapidly growing need for the educational presentation of biological subjects and other disciplines not covered by systematics, a further shift in emphasis may therefore be in order.

There are also other reasons that may incline a conscientious administrator towards favoring scientific talent in other than systematic fields. Under the international rules of nomenclature, the systematists work under self-imposed handicaps unequaled in any other branch of research. In my own experience I have currently found it necessary to spend as much as three-fourths to four-fifths of my available research time on problems of nomenclature, with only the smaller fraction of time devoted to the actual increase of true knowledge. The case is undoubtedly among the extremes, because the objects of study are very rare and exceptionally widely scattered both in collections and in publications. But the fact remains that the rules under which we must operate as systematists seem primarily designed to make our knowledge of each multitudinous species and subspecies an eternal monument for an individual, rather than a milestone (or inch-mark) in the progress of science. To be sure, the pharaohs had the same ambition, but there were, happily, fewer of them or the surface of the earth would have become an impenetrable maze. This, then, leaves the administrator with the unhappy knowledge that when he provides for systematic research, he provides for a type of activity

in which a major part of the effort may have to be devoted to the pure semantics of the subject, with minimum return of true additions to knowledge. This is a handicap and deterrent not imposed in any other branch of science needed for the performance of the museum's public functions.

Finally, there is the discouraging element of cost. As an illustration I may mention a request now before me for seventy-five thousand dollars worth of new cabinets to accommodate recent additions to our entomological collections. This figure alone exceeds the total amount of all requests for laboratory apparatus, instruments and equipment received from all departments, including the department of insects, over the last five years, in the course of a thorough modernization of their research facilities. In addition to the costly furnishings, we must also take account of the capital investment in building space and of the current costs of its upkeep. These drains upon an institution's resources are, again, many times as large as those imposed by the space requirements of an equal number of scientists actively engaged in the study of natural history subjects not requiring extensive systematic collections. In the light of these circumstances, it is not too difficult to understand how a committee of systematists could feel impelled to say that the period when privately endowed institutions could adequately house and curate these collections is coming to an end, and a new solution must be sought. But, against the background of all the difficulties that already exist such statements cannot fail to hasten the abandonment of taxonomy in privately endowed institutions far more than they encourage the orderly evolution of a transfer of responsibility for systematic research to national agencies. It might be well not to drop the eggs while looking for another nest to place them in.

One Hundred Curators: A Quantitative Study

JOHN R. SAUNDERS, CHAIRMAN
DEPARTMENT OF PUBLIC INSTRUCTION
THE AMERICAN MUSEUM OF NATURAL HISTORY

This is a study of the first one hundred persons (eighty-nine men, eleven women) to achieve curatorial rank on the staff of The American Museum of Natural History. It is, in part, a study of ninety of these individuals (eighty-one men, nine women) who have completed their active curatorial service. The last of the ninety completed careers terminated in 1957. The year in which the 100th person achieved curatorial rank was 1935. The study thus covers a time span from the year 1877 to the year 1957 inclusive.

There is no doubt that the curatorial classification for personnel was in use at the Museum prior to 1877. Early annual reports mention the work done by the curators of the several departments, but there is only one mention by name in these reports—Coleman Robinson. The reports do not indicate that Robinson was either salaried or full-time. It is quite likely that he fulfilled neither of these conditions.

The only reference source used for this study was the printed staff lists which appeared in the annual reports of the Museum. The first such list appeared in the report issued in 1874 and contained but two names, Professor Albert S. Bickmore, Superintendent, and Dr. J. B. Holder, Assistant. The report for 1877 includes in the staff list the name of Professor R. P. Whitfield, Curator of Geology. Whitfield was thus the first curator to appear on the official staff list of The American Museum of Natural History.

In this study only three categories of curatorial rank were considered. These were Assistant Curator, Associate Curator, and Curator. Staff positions carrying any other designation were not considered, save those of

Curator-in-Chief, Executive Curator, and Acting Curator. These three ranks were counted as equivalent to Curator for the purpose of this study.

Many of the 100 individuals whose careers were considered had a longer active association with the Museum than this study indicates. Some served first in non-staff capacities, others served on the staff as assistants and staff assistants, or as research associates before entering into the curatorial category. Others, not counted among the first 100 curators, started their Museum careers before 1935 (when the 100th curatorial post was filled), but did not become curators at the Museum until after 1935. To avoid what might otherwise be a justifiable misunderstanding, the writer repeats his statement that the data compiled for this study includes only the years served in active curatorial classifications.

Ten of the 100 individuals are still active members of the curatorial corps at this Museum. Ten are emeriti and several others are still active curators at other institutions.

In this report, names will appear only once in a table which lists the 100 individuals in chronological order of their appearance as curators on the official staff lists. In this table the date span (inclusive) of each career is given, as well as the total years served in curatorial capacity and the departmental area or areas in which the individuals performed their duties. These general areas do not necessarily indicate the actual titles of the departments. For example, Geology includes mineralogy, geology, and paleontology, and Zoology includes mammals, birds, amphibians and reptiles, fishes, insects, and invertebrates.

Four of the hundred individuals held concurrent or double curatorships. In this study, the highest curatorial rank held by any of these individuals for any given year was the rank used in computing the statistical material. Likewise, under the column giving the area of curatorship, all areas served in by each individual when acting in curatorial capacity are given. In computing the total years of curatorial service, if a given individual held curatorships in two or more departments at the same time, the total years are prorated among those departments.

Before presenting the quantitative findings of this study, it is interesting to note that the longest curatorial career was that served by the late Frank M. Chapman of ornithological fame. He served twelve years as Assistant Curator, seven years as Associate Curator, and thirty-five years as Curator, for a grand total of fifty-four years. In addition, Chapman was associated with the Museum in a non-curatorial capacity prior to his appointment as Assistant Curator, and he served three years as Curator Emeritus. With the compulsory retirement age now at sixty-eight, and the present practice of assuming that a junior curator possess a Ph.D. as a requirement for appointment, such a long record of curatorial service as

was Chapman's cannot now be acquired.

In 1952, the curatorial classifications were removed from the Department of Public Instruction, where they had been used since 1884 for a span of sixty-eight years, and from the Department of Astronomy, which had used them since 1928. Prior to 1952, curatorships appeared for short spans in the library, in publications, and in preparation. Today the curatorial designations are reserved solely for those working in research departments.

The total number of curatorial years served to date by the first 100 persons to hold such posts is 1,716 years, an average of 17.16 years per individual. Of this group, ninety persons completed curatorial careers for a total of 1,436 years, an average of 15.95 years per individual. The range in years of service for the first 100 curators is from one to fifty-four years, and the median is fifteen years. The range for the ninety complete careers is also from one to fifty-four years, the median thirteen years. The range for the ten individuals still in active service out of the first 100 curators is from twenty-three to thirty-two years, the mean is twenty-eight years and the median is an impressive twenty-nine years. May it continue to increase!

In general, the study indicates that a sizable number of this group of dedicated men and women served long careers. Exactly half of the group served fifteen or more years and 43 per cent served twenty or more years. Much of the Museum as we know it today—its collections, its exhibits, its publications, both popular and scientific, its reputation as a scientific and educational institution—is, in no small measure, the handiwork of these 100 individuals. Hundreds of others who served along with them as office boys, directors, attendants, accountants, librarians, photographers, carpenters, artists, teachers, technicians, and in a host of other occupa-

continued on page 24

Four tables which present organizations of the data follow as indicated below:

TABLE 1—The First One Hundred Curators at The American Museum of Natural History

TABLE 2—Distribution of Curatorial Effort of Staff of The American Museum of Natural History

TABLE 3—Progression in Rank of Ninety Completed Curatorial Careers at The American Museum of Natural History

TABLE 4—Distribution of Curatorial Effort of Research Departments and of Teaching and Service Departments at The American Museum of Natural History

TABLE 1. The First One Hundred Curators

NAME	CAREER SPAN	TOTAL CURATORIAL YEARS	AREAS OF SERVICE
Whitfield, R. P.	1877–1908	32	geology
Gratacap, L. P.	1879–1916	38	geology
Holder, J. B.	1880–1887	8	zoology
Bickmore, A. S.	1884–1903	20	anthropology, public instruction
Allen, J. A.	1884–1920	37	zoology
Chapman, F. M.	1888–1941	54	zoology
Terry, J.	1890–1893	4	anthropology
Osborn, H. F.	1891–1909 (1928–1930)	22	geology
Wortman, J. L.	1891–1898	8	geology
Beutenmuller, W.	1893–1910	18	zoology
Hovey, E. O.	1894–1924	31	geology
Putnam, F. W.	1894–1902	9	anthropology
Saville, M. H.	1894–1906	13	anthropology
Matthew, W. D.	1895–1927	29	geology
Boas, F.	1895–1904	10	anthropology
Hay, O. P.	1899–1906	8	geology
Bumpus, H. C.	1900–1901	2	zoology
Smith, H. I.	1900–1910	11	anthropology
Sherwood, G. H.	1901–1937	37	zoology, public instruction
Woodward, A.	1902–1908	7	maps and charts
Farrand, L.	1902–1903	2	anthropology
Wheeler, W. M.	1902–1907	6	zoology
Tower, R. W.	1902–1925	24	physiology, books and publications
Dean, B.	1903 (1906–1912)	8	geology, zoology
Dahlgren, B. E.	1903–1907	5	zoology, preparation
Wissler, C.	1904–1941	38	anthropology
Miner, R. W.	1906–1942	37	zoology
Lowie, R.	1909–1921	13	anthropology
Crampton, H. E.	1909–1921	13	zoology
Lutz, F. E.	1909–1942	34	zoology
Hussakof, L.	1909–1916	8	geology
Granger, W.	1910–1940	31	geology
Brown, B.	1910–1941	32	geology
Goddard, P. E.	1910–1928	19	anthropology
Spinden, H. J.	1910–1921	12	anthropology
Winslow, C.-E. A.	1910–1921	12	public health
Andrews, R. C.	1911–1941	31	zoology, Asiatic exploration
deWitt Miller, W.	1911–1928	18	zoology
Dickerson, M. C.*	1911–1920	10	woods and forestry, zoology
Nichols, J. T.	1911–1952	42	zoology
Mead, C. W.	1912–1925	14	anthropology
Gregory, W. K.	1912–1913 (1921–1943)	25	geology, zoology, comparative anatomy
Borup, G.	1912	1	geology
Nelson, N. C.	1912–1942	31	anthropology
Skinner, A.	1913–1915	3	anthropology
Reeds, C. A.	1913–1937	25	geology
Fisher, G. C.	1914–1940	27	public instruction, astronomy
Moore, B.	1917–1918	2	woods and forestry

TABLE 1. continued

NAME	CAREER SPAN	TOTAL CURATORIAL YEARS	AREAS OF SERVICE
Sullivan, L. R.	1918–1925	8	anthropology
Anthony, H. E.	1919–1957	39	zoology
Lang, H.	1919–1926	8	zoology
Whitlock, H. P.	1919–1940	22	geology
Noble, G. K.	1919–1939	21	zoology, experimental biology
Chapin, J. P.	1920–1948	29	zoology
Crosby, R. E.°	1920–1923	4	public instruction
VanName, W. G.	1921–1941	21	zoology
Griscom, L.	1921–1927	7	zoology
Murphy, R. C.	1921–1953	33	zoology
Mutchler, A. J.	1922–1937	16	zoology
Schmidt, K. P.	1922	1	zoology
Ramsey, G. F.°	1922–1952	31	public instruction
Chubb, S. H.	1923–1937	15	comparative anatomy
Mook, C. C.	1923–1937	15	geology
Ortenburger, A. I.	1923	1	zoology
Greig, M.°	1924–1929	6	public health
Raven, H. C.	1924–1943	20	comparative anatomy
Morris, F. K.	1924–1925	2	Asiatic exploration
Mason, J. A.	1925	1	anthropology
Hood, I. R.°	1926–1934	9	library and publications
Shapiro, H. L.°°	1926–1957	32	anthropology
Mead, M.°, °°	1926–1957	32	anthropology
Carr, W. H.	1927–1945	19	public instruction
Simpson, G. G.°°	1928–1957	30	geology
Pope, C. H.	1928–1934	7	zoology
Hatt, R. T.	1928–1934	7	zoology
Vaillant, G. C.	1928–1940	13	anthropology
Daniel, H.	1928–1934	7	*Natural History* magazine
Goodwin, G. G.°°	1929–1957	29	zoology
LaMonte, F. R.°, °°	1929–1957	29	zoology
Curran, C. H.°°	1929–1957	29	zoology
Burt, C. E.	1930	1	zoology, experimental biology
Olsen, R. L.	1930–1931	2	anthropology
Zimmer, J. T.	1931–1956	26	zoology
Tate, G. H. H.	1931–1953	23	zoology
Bennett, D. A.°	1932–1938	7	public instruction, astronomy
Helprin, S. E.	1932	1	geology
Carter, T. D.	1932–1957	26	zoology
Bennett, W. C.	1932–1937	6	anthropology
Colbert, E. H.°°	1933–1957	25	geology
Gertsch, W. J.°°	1933–1957	25	zoology
Mayr, E.	1933–1952	20	zoology
Gay, H.°	1934	1	library and publications
Clausen, H. J.	1934–1936	3	experimental biology
Gudger, E. W.	1935–1937	3	zoology
Barton, W. H.	1935–1943	9	astronomy
Lockwood, M.°	1935–1945	11	astronomy
Draper, A.	1935–1939	5	astronomy
O'Brien, C. E.°°	1935–1957	23	zoology
Weitzner, B.°	1935–1956	22	anthropology
Hill, J. E.	1935–1947	13	zoology, comparative anatomy

° Women

°° Career not completed

NOTE: H. F. Osborn, B. Dean and W. K. Gregory served as Curator Emeritus, Honorary Curator, or Associate during interim periods in their spans of service.

TABLE 2. Distribution of Curatorial Effort of Staff for the First 100 Curators and 90 Completed Curatorial Careers

DEPARTMENT	MAN-YEARS		% OF TOTAL EFFORT		% OF INDIVIDUALS		AVERAGE YEARS PER INDIVIDUAL	
	First 100 Curators	90 Completed Careers	First 100 Curators	90 Completed Careers	First 100 Curators	90 Completed Careers	First 100 Curators	90 Completed Careers
Zoology[1]	726.33	565.33	42.4	39.4	35.96	33.28	20.1	16.9
Geology[2]	370.33	315.33	21.6	21.9	17.84	17.60	20.7	17.9
Anthropology	297.00	233.00	17.3	16.2	21.10	21.22	14.0	10.9
Public Instruction[3]	128.00	128.00	7.5	8.9	5.90	6.56	21.6	19.5
Comparative Anatomy[4]	61.84	61.84	3.6	4.3	3.34	3.71	18.5	16.6
Library and Publications[3]	36.00	36.00	2.1	2.5	4.50	5.00	8.0	7.2
Astronomy[3]	36.00	36.00	2.1	2.5	3.86	4.29	9.3	8.3
Asiatic Exploration[4]	19.00	19.00	1.1	1.3	1.50	1.67	12.6	11.3
Public Health[4]	18.00	18.00	1.0	1.3	2.00	2.22	9.0	8.1
Experimental Biology[5]	14.00	14.00	.8	1.0	2.00	2.22	7.0	6.3
Woods and Forestry[6]	7.00	7.00	.4	.5	1.50	1.67	4.6	4.2
Preparation[3]	2.50	2.50	.1	.2	.50	.56	5.0	4.4
	1,716.00	1,436.00	100.00	100.00	100.00	100.00		

[1] Includes mammals, birds, reptiles and amphibians, fishes, insects, other invertebrates
[2] Includes mineralogy, geology, paleontology
[3] Do not carry curatorial titles at present (1957)
[4] Not in existence today (1957)
[5] Animal Behavior present departmental name
[6] Vegetation Studies present departmental name

TABLE 3. Progression in Rank

[3] Do not carry curatorial titles at present (1957)

[6] Vegetation Studies present departmental name

TABLE 3. Progression in Rank of Ninety Completed Curatorial Careers

	Number of Individuals	Total Years Served	Range Years Served	Mean Years Served	Median Years Served
HOLDING 1 RANK IN CAREER (42)					
Assistant Curator	20	87	1–14	4.35	3.50
Associate Curator	4	22	2–15	5.50	2.50
Curator	18	245	1–37	13.66	9.50
Totals	42	354	1–37	8.45	7.00
HOLDING 2 RANKS IN CAREER (17) (Assistant Curator and Associate Curator)					
As Assistant Curator	17	105	1–15	6.17	6.00
As Associate Curator	17	152	1–25	8.94	10.00
Complete Career	17	257	8–29	15.11	15.00
HOLDING 2 RANKS IN CAREER (6) (Assistant Curator and Curator)					
As Assistant Curator	6	36	1–21	6.00	3.50
As Curator	6	117	2–33	18.33	20.00
Complete Career	6	153	5–38	25.50	31.50
HOLDING 2 RANKS IN CAREER (8) (Associate Curator and Curator)					
As Associate Curator	8	38	1–11	4.75	4.00
As Curator	8	134	7–32	16.75	15.00
Complete Career	8	172	8–39	21.50	19.50
HOLDING 3 RANKS IN CAREER (17) (Assistant Curator, Associate Curator, Curator)					
As Assistant Curator	17	97	1–12	5.70	6.00
As Associate Curator	17	132	2–16	7.76	7.00
As Curator	17	271	3–35	15.94	16.00
Complete Career	17	500	8–54	29.41	31.00
90 COMPLETE CURATORIAL CAREERS	90	1,436	1–54	15.94	13.00

TABLE 4. Distribution of Curatorial Effort of Research Departments and of Teaching and Service Departments

RESEARCH DEPARTMENTS	Percentage of Effort		TEACHING AND SERVICE DEPARTMENTS	Percentage of Effort	
DEPARTMENTS	First 100 Curators	90 Completed Careers	DEPARTMENTS	First 100 Curators	90 Completed Careers
Zoology	42.4	39.4	Public Instruction	7.5	8.9
Geology	21.6	21.9	Library and Publications	2.1	2.5
Anthropology	17.3	16.2	Astronomy	2.1	2.5
Comparative Anatomy	3.6	4.3	Public Health	1.0	1.3
Asiatic Exploration	1.1	1.3	Preparation	.1	.2
Experimental Biology	.8	1.0		12.8	15.4
Woods and Forestry	.4	.5			
	87.2	84.6			

tions, valiantly supported the curatorial efforts.

This is not an attempt at evaluation, for the labor of each museum worker, in its own peculiar way, contributes to the end product. However, of all these workers, curators are a breed unique to the museum profession. Therefore, it seemed justifiable to devote some time to a study of this species. This is a small beginning. The data provided are not expected to have any marked effect upon the profession, but along with future studies—studies which it is hoped will penetrate more deeply into the nature of both the genera (museologist) and species (curator) and possibly some sub-species (assistants, staff assistants and scientific assistants)—there may emerge eventually a compilation of data which may serve to describe for future generations the nature and behavior of that basic worker in the museum arena, namely the ubiquitous curator.

The writer does not intend to evaluate the data presented in the several tables. All he hopes is that in some small way the organization of this information may not only be a contribution to the history of his vocation, but also may help to portray one aspect of curatorship, namely the length and distribution of active curatorial service at The American Museum of Natural History.

Exhibits and Ideas

BOBB SCHAEFFER, CURATOR OF FOSSIL FISHES AND
MARY B. PATSURIS, SCIENTIFIC ASSISTANT
THE AMERICAN MUSEUM OF NATURAL HISTORY

It is an interesting but not always rewarding experience for a curator to play detective in one of his exhibition halls and watch the visitors circulate among the exhibits. Although some exhibits are obviously more attractive than others, it is practically impossible, without direct questioning, to determine why a visitor will pause in front of a particular exhibit. A brief survey conducted at The American Museum of Natural History some years ago, involving direct interrogation of the visitor, showed that the reasons ranged from genuine interest in the subject matter to resting sore feet. Since thousands of visitors go to museums every year, each with a slightly different background and sphere of interest, it is clearly not possible to make all museum exhibits uniformly attractive. For most people with no training in or particular acquaintance with natural history, the most exotic, the biggest, the smallest, the oldest, and even the most familiar objects have the greatest appeal. Dinosaurs and diamonds attract more attention than adaptations in fishes or skeletons of mammal-like reptiles. Even if an entire hall or a single case is carefully designed to tell a particular story, and one exhibition unit follows another in a logical sequence, the visitor is still inclined to pick and choose as the layout designs or objects before him strike his fancy.

The much-discussed question of whether an exhibit should be designed for the "informed" visitor and student or for the general public cannot be readily answered. The fact is that most modern exhibition halls in the larger natural history museums include, either by design or accident, exhibits that range from the fairly technical to the frankly popular, from a consideration of polymorphism in birds to a habitat group of flamingoes flying in the setting sun. In this way a hall should offer some interest for

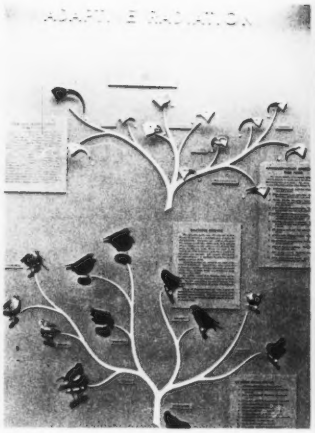


Fig. 1

Fig. 2

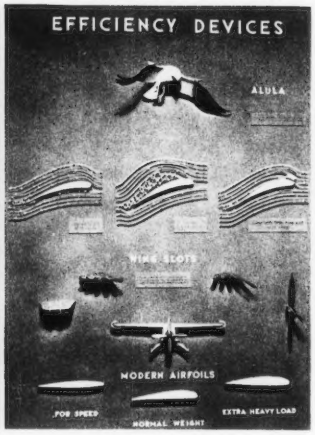


Fig. 3

nearly everyone.

Broadly speaking, there are two sorts of natural history exhibits which may be termed factual and conceptual. The boundary between them is by no means sharp, and many exhibits represent a combination of the two. A factual exhibit usually consists of one or more objects with identification and locality labels. The conceptual exhibit also involves specimens, but these are placed in a context to illustrate an idea, theory or scientific principle. Thus, the primary purpose of the conceptual exhibit is to demonstrate how observable facts are interrelated. The finches of the Galápagos Islands may be lined up in a case simply to demonstrate the fact that there are fourteen species grouped into four genera on these islands. They may also be arranged on a dendrogram[1] to illustrate the principle of adaptive radiation in previously unoccupied environments (Fig. 1). The student may be able to visualize the radiation from the first arrangement, but the layman will surely require the dendrogram treatment.

Conceptual exhibits cannot always be spectacular from the standpoint of the specimens used, since the latter must be selected primarily with the concept, rather than the intrinsic popular appeal, in mind. But it must be remembered that there is really no limit to the possibility of illustrating ideas. A beautifully designed and properly labeled habitat group can demonstrate principles of ecology, and a *Brontosaurus* skeleton, principles of biomechanics.

The thesis that a natural history museum should exhibit ideas as well

[1] A diagrammatic family tree showing the presumed relationships between living genera or species only.

Fig. 1. The concept of adaptive radiation as illustrated by the Hawaiian honey-creepers and Darwin's finches in the Sanford Memorial Hall of Biology of Birds in The American Museum of Natural History.

Fig. 2. An exhibit on polymorphism in the Sanford Memorial Hall of Biology of Birds.

Fig. 3. One of six units illustrating the principles of bird flight in the Sanford Memorial Hall of Biology of Birds.

Fig. 4. Part of an exhibit on adaptations in dinosaurs in the American Museum's Brontosaur Hall.

Fig. 4

as facts is not a new one. G. Browne Goode discussed it in 1890 and W. K. Gregory considered it again in 1936. The change from a case crammed with specimens, the "open storage" of the past, or what Gregory deridingly called "a dictionary for reference," to one containing a relatively small number of well-chosen, properly labeled specimens is fortunately a nearly universal trend today. This simplification is an important consideration in the design of a factual exhibit and is of even greater importance in the conceptual exhibit, if only to avoid overwhelming the visitor with objects. It should encourage him to pause and think about the content.

At the present time conceptual exhibits, to the writers' knowledge, have been set up in only a few natural history museums in this country, and none were observed during a recent visit to Europe. There is no obvious reason for this exclusion except that such exhibits have received little consideration. Some curators, like teachers, are inclined to think in terms of facts, some in terms of principles illustrated by the facts. Others recognize a need for both. In a university course in biology, the lectures may be devoted to principles and factual interpretation, and the laboratory to demonstrating the facts. The museum curator can combine facts and principles in teaching through the medium of his exhibit.

The university museum would appear to be the logical choice for emphasis on the conceptual exhibit. Here the ideas discussed in the classroom and laboratory might be set forth with a wide range of material without primary regard for the off-campus visitor. Many university museums, however, are also public museums, and must appeal to the public as well as to the student. Small regional and municipal museums empha-

Fig. 5

size by their very nature the factual aspects of the local natural history. The large natural history museums, with their special programs for students and teachers, still have a primary obligation to the public, a public which is by and large not conditioned to heavy doses of erudition.

It is reasonable to assume that G. Browne Goode's museum of ideas would have little popular appeal. As Albert E. Parr (1939) pointed out, visitors come to a museum to be entertained as well as informed, and the aims of an institution are not debased by providing some entertainment. Nevertheless, it might be well to recall that there are people everywhere who want to learn, and one of the main functions of a museum is to teach. Although these truisms may be manifest to most people concerned with the planning of exhibits, the informative value and intellectual stimulation of many factual exhibits can still be questioned. But factual exhibits are necessary and not every factual exhibit can or should be turned into a conceptual one. An exhibit on the collection and preparation of fossils or one showing the family tree of the dinosaurs are valuable in their own right for the information they convey to the visitor and for their popular appeal. So the problem of conceptual versus factual exhibits resolves itself, not into one of inclusion or exclusion of either type, but rather into one of how and how much to teach by either or both types of exhibits. The answer is perhaps simply to mix conceptual exhibits with factual exhibits at appropriate places even within the confines of a single exhibition hall. A case devoted to the principles of historical biogeography based on the South American mammalian fauna cannot possibly include more than a fraction of the specimens needed to illustrate these principles. But if this case is associated with others containing skeletons and restorations of the extinct members of the fauna, there is a real tie-in with the factual basis for this exhibit. An example of this point is the inclusion of a case on adaptations in dinosaurs in the Brontosaur Hall of The American Museum of Natural History (Fig. 4), an exhibit that helps the visitor to interpret the dinosaur skeletons he sees in the hall in terms of the environments they occupied, together with their adaptations for feeding, defense and locomotion. The shift in emphasis, from facts to ideas and back again, can provide a pleasing alternation for the visitor without confusing him.

The Sanford Memorial Hall of Biology of Birds in The American Museum of Natural History includes conceptual exhibits dealing with adaptive radiation, speciation, polymorphism (Fig. 2) and principles of bird flight (Fig. 3), as well as factual exhibits dealing with bird phylogeny, classification and anatomy. The Giant Sloth Hall, now under construction,

will contain, in addition to factual exhibits illustrating the history of a number of mammalian orders, a case devoted to the principles of historical zoogeography, as well as a sequence on the preservation, collection, preparation and interpretation of fossils. One of the units of the section on the interpretation of fossils deals with the principles and practice of classification. Various attempts were made to explain graphically the nature of the systematic hierarchy. The method finally decided upon is illustrated by Figure 5. The small black dots indicate species, which are included in larger circles representing genera—and so on up to the phylum which is depicted by this diagram. There will be five diagrams, representing the five basic steps in the hierarchy, each more inclusive than the preceding one. This approach, it is believed, helps to explain the cumulative nature of the taxonomic hierarchy more effectively than the conventional bracket approach.

In the American Museum's Warburg Hall, which is concerned mainly with the ecology of a rural area near New York City, facts and concepts have been successfully combined within single exhibition units. One of

Fig. 6

Fig. 5. One of five diagrams which will be used to illustrate the principles of classification in the Giant Sloth Hall in The American Museum of Natural History. This diagram represents the phylum with its included classes, orders, families, genera and species, each taxonomic unit being represented by a progressively smaller circle.

Fig. 6. The interrelationship between plant and animal associations found in different environments are illustrated in this habitat group in the Warburg Hall of The American Museum of Natural History.

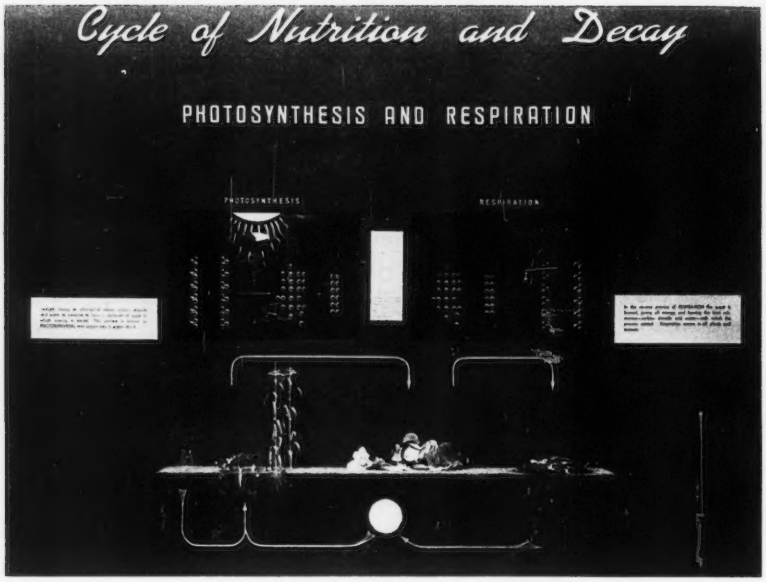
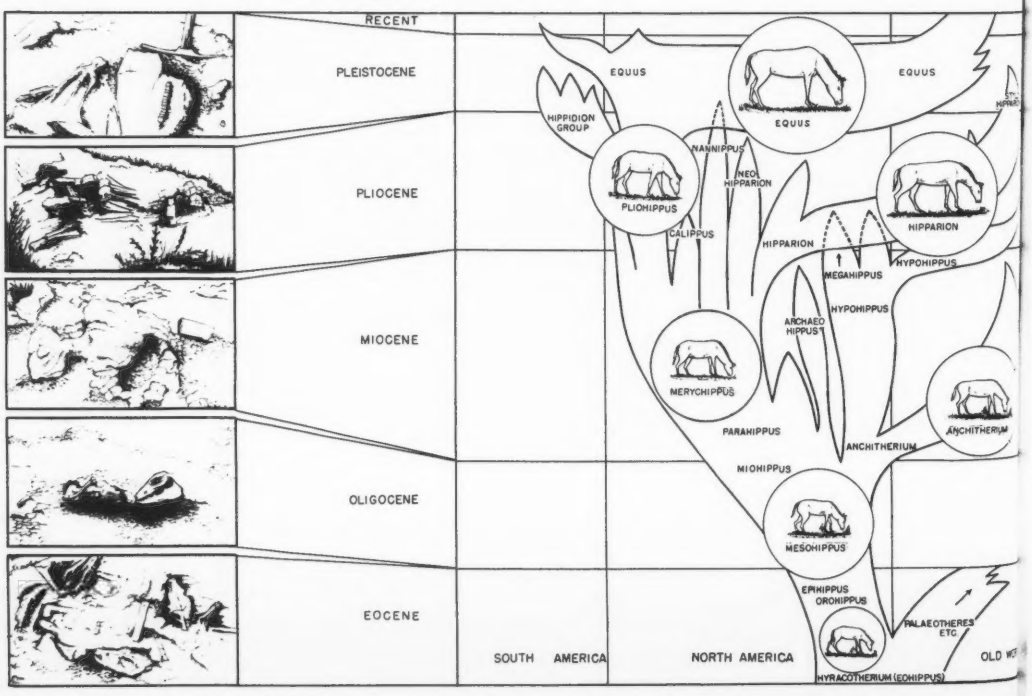


Fig. 7. One of three units in an exhibit on the cycle of nutrition and decay in the Warburg Hall.

Fig. 8. A sketch of an exhibit for the Giant Sloth Hall which will illustrate the concept of phylogeny. Photographs on the left will show fossil horse remains as found in the field.



the habitat groups in this hall (Fig. 6) illustrates the interrelationship between plant and animal associations characteristic of different environments, and the balance between population size and food supply in nature. Man's role in interrupting this balance is indicated by a plowed field. The ecological principles illustrated by the exhibit are set forth in a brief label. Although the label is not specific, in the sense that no direct reference to any of the fauna or flora shown is made, enough information is given so that the interested visitor can analyze the exhibit in terms of these principles. An exhibit on the cycle of nutrition and decay also includes conceptual and factual elements. This exhibit is divided into three parts. The first consists of models which demonstrate nutrition in the bean plant. The second is a diagrammatic representation of the nutrition-decay cycle (Fig. 7). The third is a small habitat group showing the cycle in operation.

Conceptual exhibits usually do not require the use of rare specimens or elaborate designs. Most biological or geological principles can be illustrated with readily available specimens, casts, or pictorial cut-outs, supplemented with whatever interpretive materials (such as graphs, maps or diagrams) are considered necessary. The important point here is to select and utilize the materials decided upon in a manner that will present the essence of the concept as simply, clearly, and graphically as possible. For example, phylogenetic trees are commonly used to illustrate the history of a group of organisms with a reasonably good fossil record. Such trees may be fairly complicated, but if the layout design is good, the story will be clear. The materials used to demonstrate the history of a particular group might also, with a shift in emphasis, be used to consider in a general way the *concept* of phylogeny. In the Giant Sloth Hall referred to above, the concept of phylogeny will be illustrated with a family tree of the horses plus a series of field photographs showing a fossil horse skeleton *in situ* for each of the geologic epochs represented (Fig. 8). The accompanying label will read as follows:

Frequently it is possible to collect fossil specimens belonging to a single group of organisms from a vertical series of rock layers. The field photographs on the right show fossil horse skeletons in rocks of successively younger age. When study reveals gradual changes in the form and structure of these specimens through time an ancestor-descendant relationship is indicated. From such evidence it is then possible to work out a genealogy or phylogeny. A phylogenetic or family tree, such as the one represented here for the horse family, shows many different lines of descent arising from a common ancestral stock. One of these lines leads to the living horse.

It is perhaps unnecessary to state that the primary purpose of any museum exhibit in science is to present facts and ideas to the visitor, not to illustrate some new exhibition technique. In many museums the curator must design his own exhibits, including the final layout and the color

scheme. Some institutions are fortunate enough to have professional designers whose job it is to create the exhibit from the data supplied by the curator. To cooperate effectively in the creation of an exhibit, non-scientific personnel involved in the design and layout stage must comprehend the purpose and content of the exhibit. This point cannot be overemphasized. The proposed materials of the exhibit—specimens, maps, charts, drawings, photographs, and so forth—should be discussed by curator and designer early in the layout stage in order to reduce duplication of effort in producing the final result. This is particularly important in a conceptual exhibit where the materials must be arranged in a specific manner to convey an idea. The dictates of modern design will, in many instances, have to be modified in order to do this successfully. The final responsibility for the success of an exhibit must rest with the curator, because he alone provides the factual basis for the exhibit. This is in no way meant to minimize the role of the designer to whom is assigned the task of providing a pleasing and readily comprehensible end product.

The importance of adequate and well-written labels for any exhibit has been stressed in many articles and books on exhibition techniques, and the general aspects of this problem need not be reiterated here. There are, however, some problems involving the preparation of labels for conceptual exhibits which require comment. The visitor may have little or no familiarity with the concept being presented. He is also presumably unfamiliar with much of the technical terminology which might be employed to explain the concept clearly and succinctly. The label-writer is therefore obliged to present the essentials of the concept in language that the visitor will understand. To do this in a label of reasonable length is frequently very difficult, and careful judgment must be employed in deciding how far the concept should be developed and what points should be stressed. The entire label must be written with the layout constantly in mind and with specific mention of the specimens, diagrams, and so forth used to illustrate the concept. Once the labels have been completed, it is desirable to have them criticized by a person who has had experience in using exhibits for teaching purposes. In this way unsuspected ambiguities, overly technical terminology, as well as inadequate explanation or information can then be discovered and corrected.

The traditional exhibition policy in most natural history museums has been to demonstrate the diversity and history of life through various types of essentially factual exhibits. This objective, for obvious reasons, will never be outmoded. But today natural history is much more than an accumulation of facts. Emphasis has switched to the interpretation of the facts in terms of evolution, ecology, biogeography and all the other interrelated fields which contribute to the understanding of organisms, both

living and extinct. The visitor must be made aware of this much broader horizon in the exhibition halls. This, in essence, is the purpose of the conceptual exhibit.

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Television and the Museum

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MILWAUKEE PUBLIC MUSEUM

The pattern of progress in the museum world has been most brilliantly reflected in the transition from passive collection to active and increasingly effective visual education. Internally, it is most readily seen in growing numbers of bright and pleasant exhibit halls, with dramatically simple display and lighting techniques, concise lucid labels, and attractive appointments. More important, however, are the broadening objectives which such effective design implies. Museums are coming to life as vital institutions with a story to tell, a service to perform. Exhibits are today augmented by extensive school programs, loan collections, and film programs. Future progress and growth lies in the extension of service.

As a supplement to regular museum services, television is both available and appropriate. Although it is not yet extensively utilized by museums, the medium is capable of vital, visual communication, telling the museum story with immediacy, dramatic focus, high interest, and broad appeal.

The power and versatility of television in effectively presenting the museum story has been impressively seen in network programs. In the history of museum television, the earliest landmark is the entertaining, informative "What in the World?" which, in presenting some rather remarkable museum mentalities in a dignified guessing game, rendered a great service to museums by revealing the curator to be a human being—unusually bright, and often, to the layman, unbelievably brilliant in his uncanny ability to "know about things," but friendly and human, after all. Although this program eventually ran its course in this country, as do most formula or "tight format" programs, it is interesting to note that its overseas counterpart, "Animal, Vegetable, Mineral?" has been playing for the last five years to BBC audiences of five million, and, through Euro-vision, is expanding to the continent.

More directly indicative of television's ability to help accomplish museum objectives was the outstanding award-winning program "Adventure," produced by CBS for The American Museum of Natural History. Ingenuity and imagination, erudition and drama, combined to make each program an exciting popular documentary which presented an intriguing picture of the world of natural history, and a fascinating glimpse of the world of museum science. The capable, authoritative commentary of Charles Collingwood illuminated unforgettable adventures such as "Waters of the World," "The Way of the Navaho," and the unequalled "Family of Man." Programs on heredity (with dancing chromosomes), evolution, animal behaviour, and exploration presented a dynamic cross-section of museum activity. Museum personnel at times gave outstanding performances. Underwater adventures with Eugenie Clark charmed audiences, and Dr. Harry Shapiro, with personable perspectives on the ways of mankind, became a star in his own right. During its three years on the air, "Adventure" reached vast audiences with the museum story.

More recently, "Odyssey," a venture of epic proportions presented by CBS in cooperation with the American Association of Museums, reached the nation's viewers through ninety-six stations. Each program attracted audiences averaging eight million, with compelling documentaries tell-

Fig. 1. On one program of WCBS-TV's "Adventure" series, Dr. Harry L. Shapiro, Chairman and Curator of Physical Anthropology at The American Museum of Natural History, explains a point on evolution to Charles Collingwood, program moderator.

ing the lifelong story of man through the ages. Dramatic presentations took viewers on journeys into the past. In "A Day in the Life of a Roman G.I.," the program marched with Caesar's legions; "The Medieval Knight" dramatized the thoughts of a young man of the Middle Ages as he served his vigil-at-arms; and "Samurai Warriors" presented tales of Japanese knighthood and its influence on present day Japan. Here again the museum story was dynamically presented on a grand scale with programs of magnificent scope and dimension.

Television's abilities in presenting visual education and in telling the museum story to millions are not confined to such enviable network productions. There is a similar opportunity for all museums to reach comparable audiences by using the opportunities available to them through their own local stations. Such stations across the country accumulate the same audience reached by network. In cities of over 500,000, 90 per cent of the homes in the community are available to the museums through local television channels, either commercial or educational. Museums can develop programs to suit their particular needs and reach, through television, a community audience far greater than regular facilities would allow. Moreover, the medium enables a museum to meet a *new* public, to serve great numbers of people who would not otherwise avail themselves of museum treasures.

Television for museums is particularly appropriate. By nature, it parallels the visual methods of museum technique, and can readily be persuaded to realize the institutions' ideals of "inform, enrich and educate." Programs can help to solve the traditional problems of overcrowded exhibit space by providing additional "temporary exhibits," and can help bring to light museum treasure now buried in storage. A specific example may indicate the potential of museum television in extending museum service and supplementing attendance, while at the same time encouraging public use, interest and support.

II

In 1956, the Milwaukee Public Museum reached a cumulative television audience of over 19,000,000 viewers. At times during the winter months, when television viewing is greatest, the museum's four regularly scheduled programs reached weekly audiences of over 500,000—more than half as many people as attend the museum in a year! The success of such programs was reflected in numerous awards, consistent ratings, and enthusiastic audience response, but perhaps more important was the concomitant awakening of public interest, use and support. Through museum television a city of children and adults found fascination in the worlds of natural and human history, science, and the ways of man. The Milwaukee Public Museum, in a year when it produced more television

programs than any other museum in the country, realized its greatest success in using the new medium for extended public service.

This year of particularly outstanding achievement did not, of course, happen without design. The investigation and development of museum television production had begun in 1948 when the help and encouragement of the *Milwaukee Journal* television station enabled the first presentations of "The Museum's Explorer's Club," a young people's program featuring museum talent with adventures in travel and natural history.[1]

In 1952, when the effectiveness and practicality of museum programs had become apparent, a television coordinator was hired, and a producing unit was established within the structure of the institution's Education Department. Murl Deusing, head of the department and the project's most enthusiastic exponent, aptly defined the general purpose of the museum's television:

> To help Milwaukee citizens develop an understanding and appreciation of their environment and of themselves, and to encourage and assist them in the wholesome worthwhile use of their leisure time.

The following years saw this general purpose realized in many ways as new programs, featuring various aspects of museum activity, were developed to accomplish a variety of specific objectives. Some of these programs were ambitious attempts at public affairs documentaries, calculated to appeal to the serious interest of a limited adult audience; others, with popular presentations of museum topics, sought to provide educational entertainment for a large family attendance. A series, featuring museum scientists, was designed primarily as an experiment in presentation techniques. Another promoted museum expeditions, exhibits and activities, frankly serving publicity and public relations objectives. A few such experiments in format and technique were unusually successful, some failed outright, and many proved impractical for one reason or another. But all contributed to the museum's knowledge of the new medium, and helped to clarify its possibilities as an educational, cultural, and promotional supplement to museum services.

"Let's Experiment!" featuring a friendly scientist in a "museum lab," was developed as popular education for children of school age. To encourage an interest in science, and to assert the scientist's importance in everyday life, laboratory demonstrations of basic principles in physics and chemistry were related to everything from bicycles and ice cream to jet planes and fireboats. It was hoped that the program would supple-

[1] Today the Explorer's Club is Milwaukee's oldest television program. A real Explorer's Club provides a children's activity program every Saturday morning at the museum. *The Explorer's Log*, a nature fact and fun sheet, is circulated to thousands each week during the school year.

ment the natural history adventures of "The Explorer's Club," and would attract the same avid young following. Initial surveys, however, disclosed disappointing results—the program attracted far smaller audiences than "The Explorer's Club," and almost one third of them were adults. On the assumption that the program was losing children to the competition, a popular cartoon show, calculated changes were made. More fun and excitement, simple experiments to do at home, and a small boy to help the scientist, were added to spark its appeal for children. Subsequent surveys brought good news. The audience was quickly building, and promised to outrate even "The Explorer's Club." But somehow the percentage of adults also grew—no matter how the program was revised, adults had discovered it. They eventually came to comprise almost fifty per cent of the audience. As one father put it in a complimentary note to the museum, ". . . I have to watch in self-defense . . . my little boy keeps asking me questions I can't answer!"

The years of development were certainly not without difficulty. As programs became more ambitious and schedules more extensive, problems multiplied. Program policy and evaluation, transportation and storage, personnel attitudes—all provided an entanglement of crises which had to be repeatedly surmounted and eventually solved.

The natural differences in the methods of television, with its tendency toward the "bold broad strokes" of Madison Avenue, and the museum, with its preference for quiet restraint and thoughtful precision, presented understandable difficulties. But as the professional scientist learned the values of showmanship, the professional broadcaster gained an increasing respect for scholarship. Methods were developed to set the dramatic highlight against the background of solid information, to check extreme erudition with popular appeal, and to maintain accuracy in spite of simplification and focus. The result was highly effective museum television.

As programs managed persistently to improve and expand, it was reassuring to learn that such development was not unobserved. The project's growing success was both recognized and appreciated.

At one point, the museum had been producing "Hobby Hall," a series for a family audience, which sought to help "encourage a wholesome and worthwhile use of leisure time" and also to assert the museum's participation in everyday activities. The program had gained wide acceptance, featuring folk arts, amateur astronomers, archers, historians and such, but after a few months, good program material was getting scarce; it seemed necessary to turn to matchbook and bottletop collections. It was therefore decided to change gradually to a more serious format, expanding the program's adult interests to include cultural and public affairs. So as to retain part of the original audience, the title was to be changed only after the program had gradually transformed. Perhaps by

oversight, or perhaps because of the museum's hesitation in asserting more ambitious (and possibly unattainable) objectives, no announcement was made of the change. Yet, by the end of the year, the discerning eye of the Milwaukee Radio and Television Council, composed of about one hundred local organizations, had noticed the unannounced revision, and members had voted to present "Hobby Hall" with an award as "the outstanding adult program dealing with cultural matters." The museum now calls the program "Diorama" and admits that it presents "a view in perspective, a story in depth" in the area of cultural affairs.

As the reputation of the museum television department grew, the production opportunities provided by the station multiplied. At one time it had been necessary to beg, coax and convince program managers in bargaining for air time, but experience eventually led both to an understanding of the stations' requirements and a clarification of the practical objectives of museum television. Program quality improved, and offers for better time were followed by requests for more programs than the museum was able to provide. Invitations for cooperative documentary programs, special color educational productions, and network color participations gave a good indication of the museum's acceptance as a "package producer."

By 1957, television had come of age at the Milwaukee Public Museum. A specific summary of facts and figures might further reveal the effect and economy of the project.

PROGRAMS

The regularly-scheduled weekly programs follow:[2]

Explorer's Club (WTMJ-TV)	49
Let's Experiment (WTMJ-TV)	47
Museum News (WTMJ-TV, Man Next Door)	37
Diorama (WISN-TV)	42
Total:	175 Programs

The number of major guest appearances on various station-produced programs is estimated at twenty-four; and a series of special promotional programs (on four stations) scheduled during a one-month referendum campaign for a new museum building totaled thirty-seven. Additional short series, one-shots, and special programs included such productions as:

Museum Panorama (WXIX), featuring the museum on expedition
Discovery (WMVS-TV), featuring scientists of the museum
Midwest Science Fair (WTMJ-TV, Color)
Wide Wide World feature (WTMJ-TV, Color)
Saturday Night Theatre feature (WTMJ-TV, Color)

[2] Milwaukee Public Museum Annual Report, 1956.

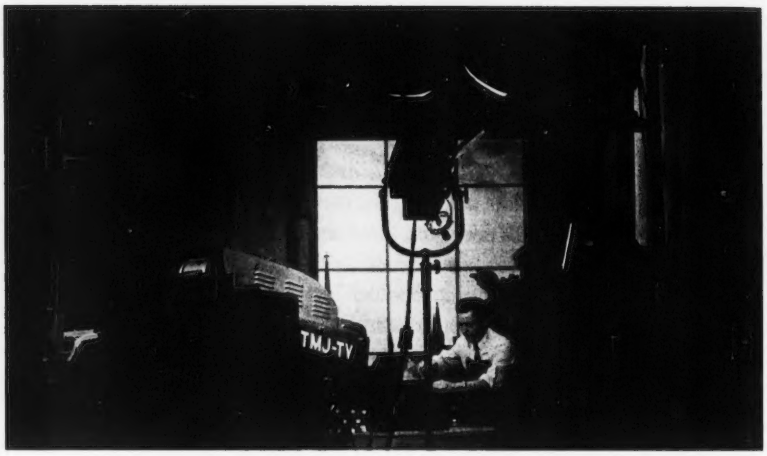


Fig. 2. "Let's Experiment!" the Milwaukee Public Museum's popular educational program on WTMJ-TV, here features Donn Brazier in his "laboratory," demonstrating basic principles of physics and chemistry.

AUDIENCE

Estimates for the Milwaukee Public Museum's television audiences cover only the four regular weekly programs, and reflect a conservative evaluation of figures derived from standard television ratings. Because it is supported by the city of Milwaukee, the museum uses the compilations for the metropolitan area, although both the surveys and the mail response indicate a strong following in rural Wisconsin. The 1956 cumulative total of 19,000,000 viewers multiplies by nineteen the actual attendance figure for that year. Although viewers perhaps cannot be validly equated with visitors, they both supplement and encourage actual attendance immeasurably.

EXPENDITURE

A financial analysis of museum program costs is somewhat complicated by great variations in preparation time, production requirements, and the number of people directly and indirectly involved. Minimum out-of-pocket costs for a single show might range from ten cents for dry ice or thirty-five cents for a toy boat to forty dollars' worth of supplies, special effects, and transportation. Maximum estimates, which must include percentages of the television salaries and the prorated time of staff members involved, reveal a highly variable total cost per program ranging from thirty dollars to one hundred and fifty dollars for the routine shows (special "one-shot" programs are usually more expensive). But even using the most generous

estimate, the program costs for museum television are small in light of the many thousands of people who benefit. It was found that in 1956 the cost per *thousand* viewers was at most one dollar and twenty cents.[3] Compared to the cost per person at museum film lectures, the cost of a postcard, a letter or brochure, television costs seem to indicate that the medium is the most economic method of serving an extensive public.

In the area of program finance, the value of air time and facilities supplied without cost by the commercial stations must be considered. Because of frequent schedule changes and the variability of time rates and discounts, such calculations can only be approximate. An educated guess, however, would estimate that in 1956 the museum used, free of charge, at least fifty to seventy-five thousand dollars' worth of air time and broadcast facilities.

Today the museum's television, though produced with a competence born of the years of accumulated experience, is still far from the realization of its goal. Programs telling the concise, meaningful, dramatic story, carefully developed and artfully visualized, remain an elusive objective. Production effectiveness and program quality present an insistent challenge. But the potential is apparent. The pattern of progress in television at the Milwaukee Public Museum clearly reflects the part the new medium can play as an extension of museum visual education.

III

Although this is the experience of just one museum in television, one museum operating in a situation where many factors uniquely favored success, Milwaukee's experience seems to be duplicated by a significant handful of museums across the country which have also found it profitable to initiate and produce their own programs, and to maintain extensive television schedules. A fairly recent survey indicates that there are ten museums in the country presenting a full television season of thirty-nine weekly programs.[4] With such active projects keeping them constantly in the public eye, they are in a position to accrue both the immediate benefits of continuous "exposure," and that ultimate accumulation of experience which will insure future programming.

The same survey, however, considers that there are probably more than 300 museums in the country sufficiently large, general, and well enough located to be likely producers of programs. Of these, only eighty-two reported any television activity, and only fifty had done any actual producing. Although within the past year museum television activity may have considerably increased, there still would seem to be either a wide-

[3] This cost is a mere fraction of what commercial sponsors pay for similar "exposure."
[4] Lawton, Sherman P., *Museum Television Programs Survey Report*, 1956, University of Oklahoma, Norman, Okla.

spread reluctance to use the new medium, or a general unawareness of the nature and extent of the available opportunity.

On commercial stations, museum television is usually produced on public service time. Such sustaining, or unsponsored, segments are reserved by the station in a varied pattern throughout the daily program schedule, and are filled with the most acceptable fare the station can acquire or produce. Public service time is sometimes disdainfully considered to be confined to the poorer hours, when sponsors are scarce and audiences are sparse. Although there may at times be some truth in such contentions, this attitude, for an educational institution desiring a television availability, is misleading and unrealistic.

An off-hour audience, "sparse" by commercial standards, can constitute a very considerable number of people. Moreover, a good program will build its own audience, whatever the time. An unusual example of this took place recently in New York City, where WCBS-TV was criticized for scheduling a new educational program, to be produced in cooperation with New York University, at an hour when "no one's watching." The time: 6:30 A.M., Mondays through Fridays. The program: Dr. Floyd Zulli's now famous "Sunrise Semester" (Comparative Literature 10). The class: a city of at least 120,000 sleepily determined people, who consequently demonstrated their enthusiasm for pre-dawn education by depleting local bookstores of every available edition of the classics on Dr. Zulli's study list. Television audiences are large, the largest in the experience of most educational institutions, even when "no one's watching!"

Usually, however, public service time is scheduled at more conventional hours, and not infrequently affords an inherent audience which is substantial even by commercial standards. It offers a wide range of possibilities for museum programs. Museums will vary in the kinds of programs they might wish to produce, and station requirements or community needs may differ, but there are two important areas of programming where the opportunity for imaginative shows is universal, and where appropriate museum productions are most likely to succeed.

Really good children's programs are scarce, as any parent will acknowledge. Especially in the fields of art, history, geography, the ways of man, and, of course, the sciences, there is currently an urgent need for youthful interest and appreciation. Whether a museum would present simple visual stories, more extensive popular education, or ambitious dramatic productions, such programs for young audiences should find enthusiastic acceptance.

The second area where the potential of museum television might be of particular current importance is not easily defined. Adjacent to programs of meaningful interview, discussion and controversy, supplementing the recent "news in depth" developments, and reflecting small, focussed

facets of the epic television documentaries, it might best be implied in the words "backgrounds and perspectives." A look at current affairs from the museum viewpoint, or a consideration of museum affairs in light of the present suggests this area of informational programming, which could provide significant insight into the cultural heritage of man. Whether concerned with the arts, history, or the sciences, such programs would extend public knowledge and impart a sense of continuity relating past, present and future. By associating the museum with current affairs, programs of background and perspective would powerfully assert the museum's function in contemporary society.

Productions in areas such as these are more aptly called public affairs programs. If presented with ingenuity, visual appeal and broad interest, they are ideal candidates for public service time on commercial channels.

In educational television there is a similar potential for museum programming. The power of ETV now extends to twenty-eight stations serving an area with a population of fifty million. Other stations, not yet broadcasting, are in the process of developing programs and organizing their schedules, and it is estimated that by the end of 1958 there will be forty-two educational channels in operation. Such powerful communications outlets, affording a set of advantages which complement those of commercial stations, are in many ways ideal for museum television programs.

Educational channels now average more than thirty program hours each week, all of which is "public service" time. Much of this schedule is filled with kines (television films) from the Educational Television Center, with in-school telecast projects, or with adult-education telecourses, but a substantial portion remains available for museum programs.

Unlike most commercial stations, it is possible for an educational channel to have prime evening hours available, during which the experienced museum with a good program is able to compete for potentially larger audiences. For museum television, educational stations afford production advantages seldom enjoyed in the commercial field. Because it is not burdened with the pressure of a full schedule, crowded with sponsors or harassed by ratings, ETV can often give a museum special attention in program development, assistance in production, and extended rehearsal time. To the museum just beginning a television project, it can offer valuable instruction in television methods. To the experienced, it can offer freedom to experiment in new formats and presentation techniques.

The audiences for educational television would seem to deliver subtle advantages to some kinds of museum productions. Surveys have indicated that there are no appreciable differences—in age, education, income, etc. —between the audiences for commercial and for educational television. But one can assume that a person watching ETV has a more serious and

specific interest in his program, and is less apt to switch channels the moment the presentation becomes too learned or lags in entertainment value.

Museum programs produced for educational channels can afford to be more specifically educational and to appeal to the serious interests of an admittedly more specialized audience. In fact, it is a requirement of ETV that educational objectives be primary, and that entertainment values should never predominate. Although program quality and production effectiveness must be high enough to attract and maintain a potential audience, the numbers of viewers are here considered to be less important than the educational results.

The combined potentials of commercial and educational television offer a wide range of possibilities for museum programming, from popular musem adventure appealing to broad audiences, to intensive visual education stimulating the serious interests of a specialized attendance. In each opportunity there is also an implicit responsibility. All too often broadcasters in both the commercial and educational fields have met with reluctance and lack of interest among educators. All too often it is the broadcasters themselves who must take the initiative, and supply the enthusiasm, the action, and the money for worthwhile program endeavors. Among educational institutions, museums are best equipped to assume the responsibility of such production, best able to make a great contribution to visual education. And, from such endeavor, the greatest rewards are received by the museum.

More significant than the evaluation of reports on past experience, compilations of statistics, or detailed definitions of potential, is the recognition of the challenge implicit in the concept of museum television. Through television the museum can assert its place as a unifying force in its community today. Through television it can picture the complex pattern of man's progress against the background of his past. Television is a challenge for museums to speak the language of our time. And the time was never more propitious.

Why Talk About Science?

EARL UBELL, SCIENCE EDITOR
NEW YORK HERALD TRIBUNE

I think I can make a good case for the following proposition: public knowledge of science is *more* important for the scientist than it is for the public.

This turns inside-out a theorem which has been the *raison d'être* for the communicators of science. We have always insisted the public needs to know about science to carry on its business. This truth has not changed, as I shall show.

But the inverse has rarely been investigated because science writers have been busy assaulting the citadels of science. We have tried to convince scientists they were doing a public service by communicating with the public. Sometimes we have pointed out that if the public knew more about scientific work, financial support would be easier to obtain. But at bottom that is a trivial reason.

It was much easier to demonstrate to the scientist that he ought to talk about his science *pro bono publico*. Look about you, we said then—and we still say it—there is hardly a single material object which does not owe its existence to scientific or technological development. "Can you, as a scientist, fail to contribute to the public's understanding of it all?" we said. "Come out of your ivory tower!"

We advanced the same line of reasoning to the public. "How can you live in a scientific world without understanding it?" we asked. "You have to make dozens of decisions in your life involving scientific information; how can you afford not to be interested?" Actually, however, there is a great deal of public interest, but little information.

I have discussed the degree to which the public is interested in science in another place.[1] It has also been treated in a forthcoming national survey

[1] Ubell, Earl, "Covering the News of Science," *American Scientist*, V. 45, #5, Dec. 1957, P. 330A ff.

of the public's attitudes toward science and scientists, sponsored by the National Association of Science Writers. (Copies may be had by writing to me.) A third study shows that in newspapers reports of science and medicine always stand among the top ten items of reader interest. Both are ahead of sports and society news, and far ahead of minor crime news. These conclusions have been established by readership surveys of 130 newspapers.[2]

Public information is another story. In a pilot survey conducted by the science writers association, we found that 98 per cent of 200 persons interviewed knew what the Salk vaccine was. My, we felt proud of ourselves. Weren't we doing a fine communications job?

But the national survey set us back on our ears. Of the 2,000 persons chosen at random and questioned last spring, the same proportion knew about the Salk vaccine, but only half had ever heard of earth satellites. The science writers association is curious to know what the figure is now, and we have taken some steps to find out.

I am not permitted to reveal what the survey shows in other areas of scientific information with which one would assume the public had been well-indoctrinated, but it is enough to say that general information on scientific matters is low. This suggests that the science writers of America —about 150, working for newspapers, magazines, book houses, and television-radio—have failed. We have failed to capitalize on the public's interest and to get the information across. However, the failure is not all ours. Although the volume of science information has risen of recent years (precipitously, post-sputnik), the amount of science news actually in public media represents a pitifully small fraction of the total output. The responsibility for this belongs to the owners, managers and editors.

Some newspapers and magazines have made notable attempts to increase this coverage over the years. The science and medicine departments of *Newsweek* and *Time* are well-known. In 1956, according to a study[3] made by Peter Franklin, of my paper, the *New York Herald Tribune* and the *New York Times* together published enough science news to fill sixteen books averaging 90,000 words apiece. Outlying newspapers do not do as well.

Out of the hundreds of hours of programming on radio and television each week, less than ten hours a week—usually at odd hours—are devoted to scientific subjects, even though the networks have demonstrated the enormous public interest in the subject with a few special shows.

[2] Swanson, Chas. E., "What They Read In 130 Daily Newspapers," *Journalism Quarterly*, V. 32, #4, Fall 1955, P. 411 ff.

[3] Mr. Franklin did this study while a copy boy at the *New York Herald Tribune*. Details are given in my *American Scientist* article previously cited.

II

What is the result of this desert of scientific information? I can only guess. First, with respect to the public, let us discuss the basic theorem.

In the absence of information, the public tends to behave stereotypically with respect to science and scientists. This was demonstrated by Drs. Margaret Mead and Rhoda Metraux in their national impressionistic survey of high school students.[4] The science writers study should contribute more data on this subject. Drs. Mead and Metraux found that although the "official image" of the scientist was positive, the young American holds many mistrustful attitudes toward the scientist. "He may even sell secrets to the enemy."

I do not believe that stereotypic ideas always lead to inappropriate action; they may often do so. However, I think such ideas do lead to a general mistrust of scientists and science which may be self-destructive. Martin Gardiner in his "Facts and Fallacies in the Name of Science," published by Dover Press, N.Y., has catalogued all the kinds of foolishness to which the public has fallen prey in this country in recent times. They represent not only loss of cash but also outright personal misery, as in the case of dianetics, of happy decease.

Clichéd concepts and lack of information may lead directly to paralysis of public action. The fluoridation issue is an outstanding example. In the face of almost uniform endorsement by eminent scientists and authoritative health organizations, the measure loses in most places where a public vote is taken. Most of the losses may be laid to the scare technique used by the antifluoridationists. But could this device get anywhere with an informed public? I doubt it. A study done by Drs. Bernard and Judith Mausner[5] shows that the degree of opposition to fluoridation is related to lack of information, lack of education, and distrust of scientists.

In general, it can be said that without knowledge of the main currents of scientific thought, our population is intellectually impoverished. It is missing one of the truly great beauties created by the human mind. Albert Einstein said it most clearly: "It is of great importance that the general public be given an opportunity to experience consciously and intelligently the efforts and results of scientific research. It is not sufficient that each result be taken up, elaborated and applied by a few specialists in the field. Restricting the body of knowledge to a small group deadens the philosophical spirit of a people and leads to spiritual poverty."[6]

[4] Mead, M. & Metraux, R., "Image of the Scientist Among High School Students," *Science*, V. 126, #3270, P. 384. See also, Remmers, H. H. & Radler, D. H., "The American Teen Agers," Bobbs-Merrill, Indianapolis, Ind.

[5] Mausner, Bernard & Judith, "A Study of the Anti-Scientific Attitude," *Scientific American*, Feb. 1955.

[6] Quoted in "The Universe and Dr. Einstein," by Lincoln Barnett.

This impoverishment has spread even to those intellectuals in our society who are drawing a false dichotomy between science and the humanities. Archibald MacLeish recently tried to blame all the world's ills on science.[7] Why should this be so now, when all through the ages the intellectuals kept abreast of the main scientific trends in their age? Indeed, some of the great humanists and philosophers were scientists themselves. What has happed to make the humanists seek to split science away from the intellectual world?

I am fearful of a rise of a new kind of superstition among the general public, although I can only dimly perceive its outlines. Perhaps this is because the average individual, although surrounded by the products of science and technology, fails to understand how they work. Although some information on this is available in surveys, you may try your own experiment. Simply ask any non-scientist whether he knows what makes an electric light bulb work, or if he understands what keeps an airplane up, or what pushes a rocket. Such an environment has many similarities to that of primitive men. They, too, were in a milieu whose workings they only dimly understood. They did perceive some relationships, but their main response was magic, a magic which frequently helped them because it gave them rules based on experience.

In modern life, will we see the rise of a new magic, a weird concoction of psuedo-science and experiential rules? Very little study has been made of such modern relationships, and their investigation by the anthropologist and psychologist may prove fruitful. I am interested to see in our modern advertisements for household appliances the words: "magic," "miracle," "wonder." Are these the first flickers of superstition?

III

So much for the public. I believe I have shown why science information is important for our general society. I would now like to demonstrate why public understanding is important for the scientist.

Because a considerable portion of the population—perhaps a third—severely distrusts and misunderstands the principles of scientific investigation, scientists suffer directly. First, there is the matter of finances. This is really a lesser indignity than lack of public recognition, although to a scientist seeking a grant, it may not seem so. In former times, men of science were frequently men of independent wealth and income who pursued science as an intellectual exercise. Often they were the protégés of single powerful patrons, as Kepler was. Also, equipment was relatively simple. But nowadays it is, in effect, the general public who controls the funds for science through the pressure, or lack of it, which they place on

[7] MacLeish, A., "Why Do We Teach Poetry?" *Atlantic Monthly*, V. 197, #3, March 1956, P. 48.

their representatives in government, in school systems, in voluntary agencies, and even in certain private institutions. In this post-sputnik era, we have seen what public outcry can do in increasing government funds for science. Witness, too, the fantastic growth over the last decade of the National Institutes of Health.

It would be difficult to trace the precise channels through which financial support for science derives from public understanding, but I have seen enough symptoms of the relationship to know that they appear to be directly linked.

IV

Next is the consideration of freedom of research. The scientist has the right, although it is not written down anywhere, to investigate any corner of the material world, so long as human life is safeguarded.

But the public does not wholly subscribe to this. The science writers pilot study, which contained an overrepresentation of college graduates, showed that only 40 per cent would give the scientist the right to work on anything he liked, even if nothing practical came of it. An equal number said that a scientist should have freedom of research, because everything is practical in the long run. Many of the respondents said that scientists should not work on projects that conflicted with religion, or only on projects that served the public good—that is, were practical projects. Such restrictions have hampered studies in the epidemiology of mental disease and in a number of other areas. Fortunately, these barriers seem to be breaking down, as Dr. Alfred Kinsey's ability to do a study of sexuality shows. Nevertheless, scientists investigating society will continue to be the chief victims of these biases.

There is also a direct political effect on scientists, which stems from the public attitudes. The outstanding example, of course, was Dr. Edward U. Condon, former director of the Bureau of Standards, and now professor of physics at Washington University at St. Louis. No evidence supported the claim of the late Congressman J. Parnell Thomas that Condon was one of the "weakest links" in our atomic security system. Yet Dr. Condon, denied his request immediately to refute the charges in public, was for a time denied also the opportunity of making a living through the unjust unavailability of a security clearance.

The direct result of political intervention in scientific laboratories was amply demonstrated at the Army Signal Corps' installation at Fort Monmouth following the visit of the late Senator from Wisconsin.[8]

To these examples can be added many more which were not reported in newspapers or in which the victims did not have powerful friends to take their cases.

[8] See Phelps, J. B., & Pollard, Ernest C., "Fort Monmouth," *Scientific American*, June 1954.

Remember, too, the Congressional investigation to find out if the foundations had supported Communist scholars. This unwarranted invasion into the scholarly field was paid for in hard cash by the foundations. They paid in the tremendous amount of time they had to spend answering Congressional questionnaires.

I say that had the public truly understood the nature of science, they would never have permitted the indignities which prevailed not long ago. The only long-term insurance we have against a repetition is a broader program of communication with the public.

V

Now, the most important reason for the communication of scientific information is one which I cannot prove. I believe that it is terribly difficult for scientific ideas to be born and reared in a community which is intellectually apathetic to science.

Part of this has to do with recruitment of new scientists from among young people. In this area there is some evidence. Certain religious groups in America have contributed personnel to science out of proportion to their numbers, while others are rarely represented. For example, Father John J. Cavanaugh, former president of Notre Dame and currently head of the Notre Dame Foundation, said that the Roman Catholic educational system is not producing its "proportion of leaders." This was in a speech delivered in Washington on December 15, 1957. On January 23, 1958, at a meeting in South Bend, Indiana, the Rev. Theodore M. Hesburgh, president of Notre Dame, said that Catholic institutions of higher learning were, however, "working night and day to show a sharp upturn in events within the next ten years."

In the science writers survey, made before Russia launched its sputnik, a question was asked: "Have you ever heard of earth satellites?" Fifty-four per cent of the Roman Catholics questioned had heard nothing about them. Fifty-four per cent of the Protestants had heard nothing, and 44 per cent of the Jews had heard nothing. Only 9 per cent of the Roman Catholics knew what the function of an earth satellite was, while 12 per cent of the Protestants did and 15 per cent of the Jews.[9]

VI

So much for personnel. What about the ideas themselves? How are they born? For the answer to this, look at nineteenth century America. Only a handful of men, including Barton, Cope, Gibbs, Gray and Henry, stand out as great indigenous scientists at a time when men in Europe were taking the lead in producing the germ theory of disease, the begin-

[9] There were only 52 Jews involved here, so that the 15 per cent is a shaky number.

nings of geology, the theory of evolution, the discovery of radioactivity, the comprehension of electromagnetic phenomenon and so on.

This is so, I think, because the intellectual community in Europe was large. In America, with its beckoning frontier, intellectual pursuits were not the fashion. By enlarging the intellectual community, I believe the opportunity for ideas to originate and grow is also enlarged. And a firm, intellectual leadership can rest on the broad back of a public well-informed on the nature and data of science. This is a large order. The public possesses a great deal of misinformation and has great gaps in its learning. How are we ever going to catch up? One way is to catch them young—in the schools.

The science writers pilot survey showed that interest in science was heightened in direct proportion to the number of science courses the respondent took in grammar or high school. This was even the case for those who never finished high school. Something may be done about it in this post-sputnik era. I'm afraid, however, that it will be done for the wrong reason. Science should be taught in our schools not only to train more scientists, and enable the average citizen to deal with scientific problems, but also as part of the intellectual heritage of mankind.

Actually, the problem of teaching science in the schools goes back to elementary school, where the general teacher is uniformly ill-trained to deal with this subject matter. Since these schools are governed locally, a broad appreciation of science would, I hope, induce better science teaching.

The public media of communication—newspapers, magazines, books, radio and television—can, with the help of scientists, promulgate that intellectual atmosphere.

In their own self-interest, scientists should take every opportunity to assist in this movement. The ways of doing so are obvious. Public talks, articles, radio and television appearances all help. Scientists must not be afraid of misunderstanding on the part of the public. They must remember that information theory teaches that although there is loss in the transmission of any message, the loss can be recovered through repetition.

Cooperation with science writers is highly desirable. Publicity should not be feared. It is overrated as a killer of men, except in those few cases where it is used with malice aforethought. While sometimes scientists who break into public print are criticized by their colleagues, it should be remembered that the only thing they are really advertising is science.

Concern about the accuracy of science writers can be mitigated in one of two ways. The scientist can ask the writer, "Please tell me how you understand what I've told you?" If the writer is competent, he will be eager to double check on himself. Or the scientist can request to see the finished copy. This is often impossible in the case of newspapers with

their daily deadlines. If the competent reporter is puzzled about something, he will call to verify his statements; he doesn't like to be wrong. But magazines have much more time, and there is no reason why copy can't be checked if the scientist has contributed a major portion of the information in the article.

On television and radio programs in which he participates, the scientist should ask to see the script, if there is one. If he is being interviewed on the spot, he is on his own.

But these are only small practical suggestions. The big idea is for the scientist to communicate in whatever way possible, for we are entering a new flourishing of science in which communication of ideas to the public will play no small part.

Museum Courses as a Service to the Community

C. BRUCE HUNTER, SUPERVISOR OF ADULT PROGRAMS
DEPARTMENT OF PUBLIC INSTRUCTION

Museums throughout the world are outstanding as rich storehouses of materials that often cannot be duplicated. These materials are of little significance to the community until they are interpreted in some specific way. One of the most effective ways for The American Museum of Natural History to use its resources in community service is by giving museum courses to adults. In this Museum the vast majority of adult courses are given by the staff members of the Department of Public Instruction. The Museum has given courses to the adult public consistently since 1929. These were and still are directed mainly to teachers of the public schools.

Some of the early courses given had such titles as "A Cultural Course for Teachers in High School and College," "Applied Physiology and Health," "Backgrounds for Progressive School Units." Throughout this early period of museum courses, "methods" courses in education as well as "content" courses were given. In the 1930's the department of education played a dominant role in the community in visual aids instruction. In those years we see such courses given as "A Foundation Course in Visual Instruction" and "The Integration of Visual Instruction in the Activity Program." When visual aids in the educational program became more commonplace, the emphasis in museum courses was shifted to other ways of serving the community. For a span of some fifty years, health education played an important role as a community service by the Museum. During part of this time there was a Department of Public Health functioning in the Museum, accounting for some of the stress that was given to courses on public health. The Museum then offered such courses as "New Trends in Community Health Programs" and "Recent Advances

Fig. 1. As early as 1911, classes in botany were coming to the Museum to study artists' drawings and models of flowering plants.

Fig. 2. An informal classroom discussion is taking place in this museum course given in 1954 and 1955 and called HISTORICAL DEVELOPMENT OF NORTH AMERICAN INDIAN CULTURES

Fig. 3. A 1928 Model "A" touring car used in 1956 to take a field-study class in archeology through the jungle of Yucatan to see the rarely visited archeological zones of Sayil and Labna.

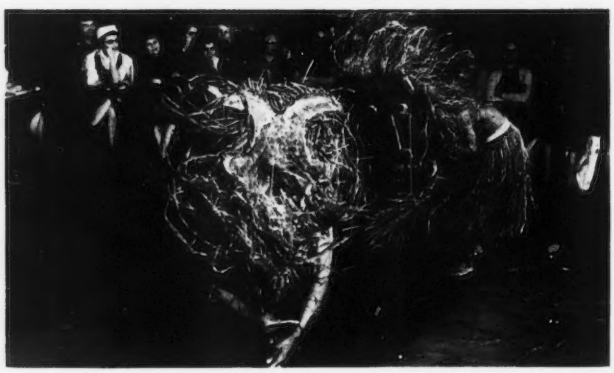


Fig. 4. A "workshop" class in action. This course, called THE LEISURE HOURS OF MAN IN REMOTE REGIONS OF THE WORLD, *was given in 1956 and repeated in 1957.*

in Physiology." Today, health courses are not given, but instead the education department offers a different type of service directed to nurses in training, called the "Nurse Education Program."

During the 1940's, and possibly because of the war, there was a greater emphasis on courses in the field of anthropology. "Primitive Peoples and Their Cultures," "Cultures of Indigenous Peoples of Africa," and "Anthropology and Interpersonal Relations" were listed. Paralleling these were a few courses in the natural science field, such as "Economic Geography of the War," "Workshop in Natural Science and Conservation," and "Studies in General Science for Teachers."

In the 1950's, with a new impetus for serving the community to a greater extent than had been done in past years, the number of museum courses offered jumped from an average of 6.8 a year during the 1930's and 1940's to 11.2 for the last five years. These were all college accredited. With the increase in the number of courses offered, there has also been an increase in the number of more specialized courses. This reflects current trends in the curricula in the public schools and colleges. In the *Museum Courses* booklet for 1957–1958 such diverse courses as "Resources of New York for Special Classes," "The World of Plants," and "Mexico and the Mexican Indians" were listed. Today, and throughout this whole period of museum courses, there has usually been some type of course in diorama making, utilizing the leadership of this Museum in that field. During this period of twenty-nine years, the educational department has offered sixty-nine different college accredited courses as a community service. Of this number, fifty-six have been repeated over a period of years, some for as many as nine years. The usual course runs on an average of from two to four years. The number of persons taking a single course has ranged from twelve persons in limited workshop classes to more than one thousand in a single large lecture course.

The 1950's also reflected changes in the professional qualifications of the staff of the educational department. In former years, many instructors who were hired had little training, and more often than not had no college degree. Today, a minimum degree of bachelor of arts or science is required, in addition to training in some area of museum specialization. In the present staff of twenty members, seven have a bachelor's degree, nine a master's degree, and two have a doctor's degree. Seven of the nine with master's degrees have taken additional work on a doctorate level.

Museum courses given by the education department have been accredited at most of the city colleges and universities at various times during this period. In-service credit has always been granted to teachers by the Board of Education of the New York City Public Schools.

In meeting the needs of the community, museum courses have pushed the walls of the Museum further apart to include activities in more di-

versified field study. A class in geology may now be meeting in one of the parks to examine the rock formations firsthand. A museum resource course may be meeting on one of the West Side streets analyzing problems presented by the recent Puerto Rican migrants to New York. It is hoped that future work in museum courses will take more of our community members into the field for firsthand experiences in both the natural and social sciences.

In the summer of 1956 the education department went farther afield. A field study tour in archeology and contemporary Indian life was conducted in Mexico and Central America—one of the areas with which our Museum's scientific staff has been concerned. This study gave this group, composed mainly of public school teachers, firsthand data in an area of their curriculum that is also constantly *their* concern.

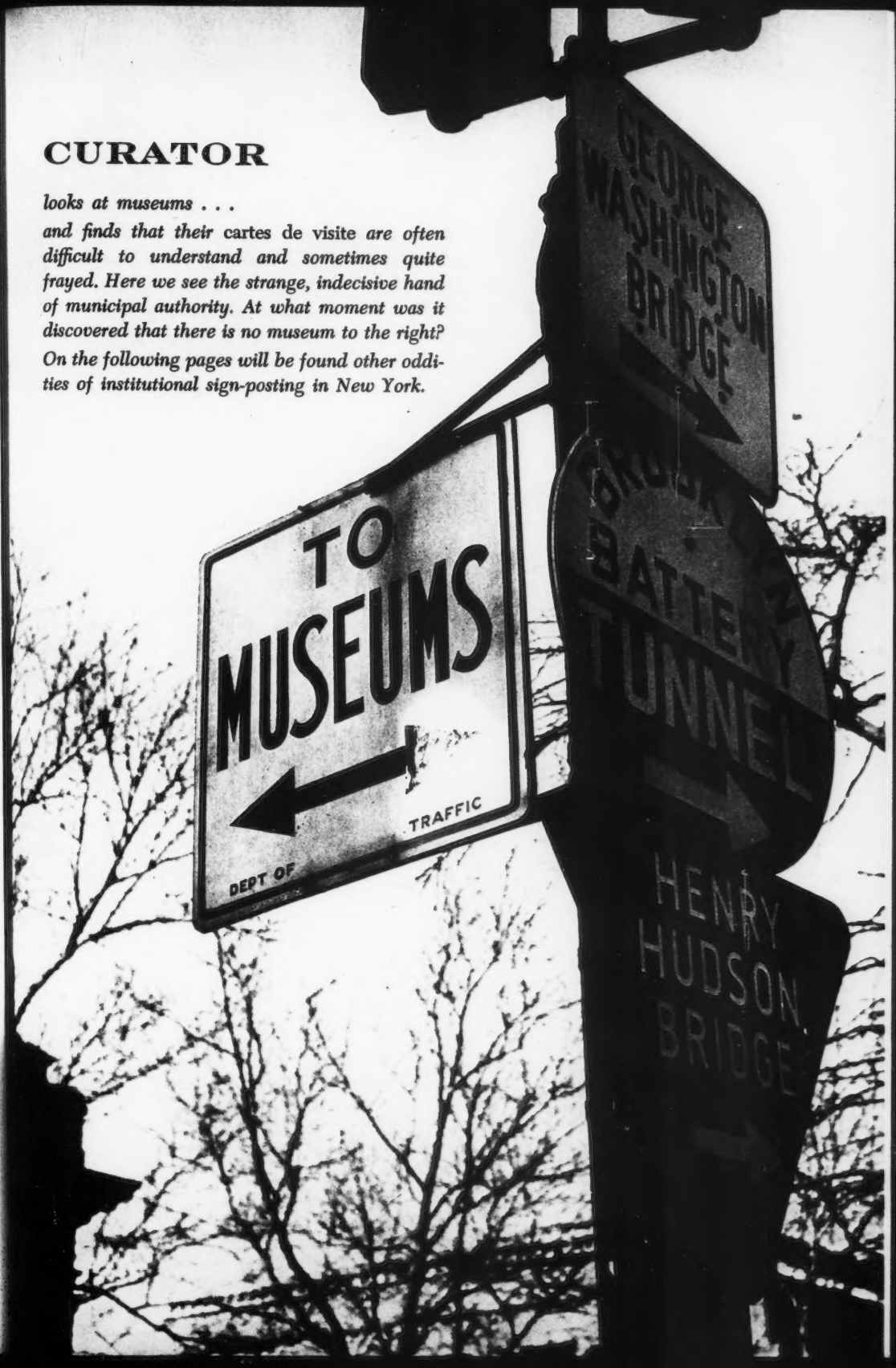
With an increasing stress on scientific techniques and an ever-changing curriculum in the colleges and public schools, the Museum education staff must keep constantly alert by further study and continual reading in the most recent researches of the scientific world. Usually museum teachers will take it upon themselves to brush up on their areas of specialization by taking additional college courses. In some instances, the education department has given the teaching staff a chance to take courses in areas of specialization that would be significant in developing certain types of programs. Although this is not a common practice, it does help relieve some of the financial burden with which the underpaid teacher is already coping.

Demands by the community for more and more service to the adult public has made it necessary for us to consider the areas of teaching that are of greatest value to the community. Our first efforts have been in teaching teachers. Areas of subject matter covered in the courses have been correlated with their own teaching curriculum. In keeping with the present emphasis on science teaching, we have altered our programs at the Museum to include more of the biological sciences. There are other determining factors that are also considered in planning any further work in adult courses. Conferences are held with members of the Board of Education to get their suggestions and reactions to proposals we may make. Conferences also are held with any colleges interested in accrediting courses offered by the education department. Of course, the areas of specialization of our own staff are always important determining factors in giving any accredited course.

A museum must always look to the future in planning educational programs. More and more, a museum's leadership in education is sought out by significant groups of people and institutions in the community. The museum's role is important in giving a service that is unique to its specialized educational facilities.

CURATOR

looks at museums . . .
and finds that their cartes de visite *are often difficult to understand and sometimes quite frayed. Here we see the strange, indecisive hand of municipal authority. At what moment was it discovered that there is no museum to the right? On the following pages will be found other oddities of institutional sign-posting in New York.*



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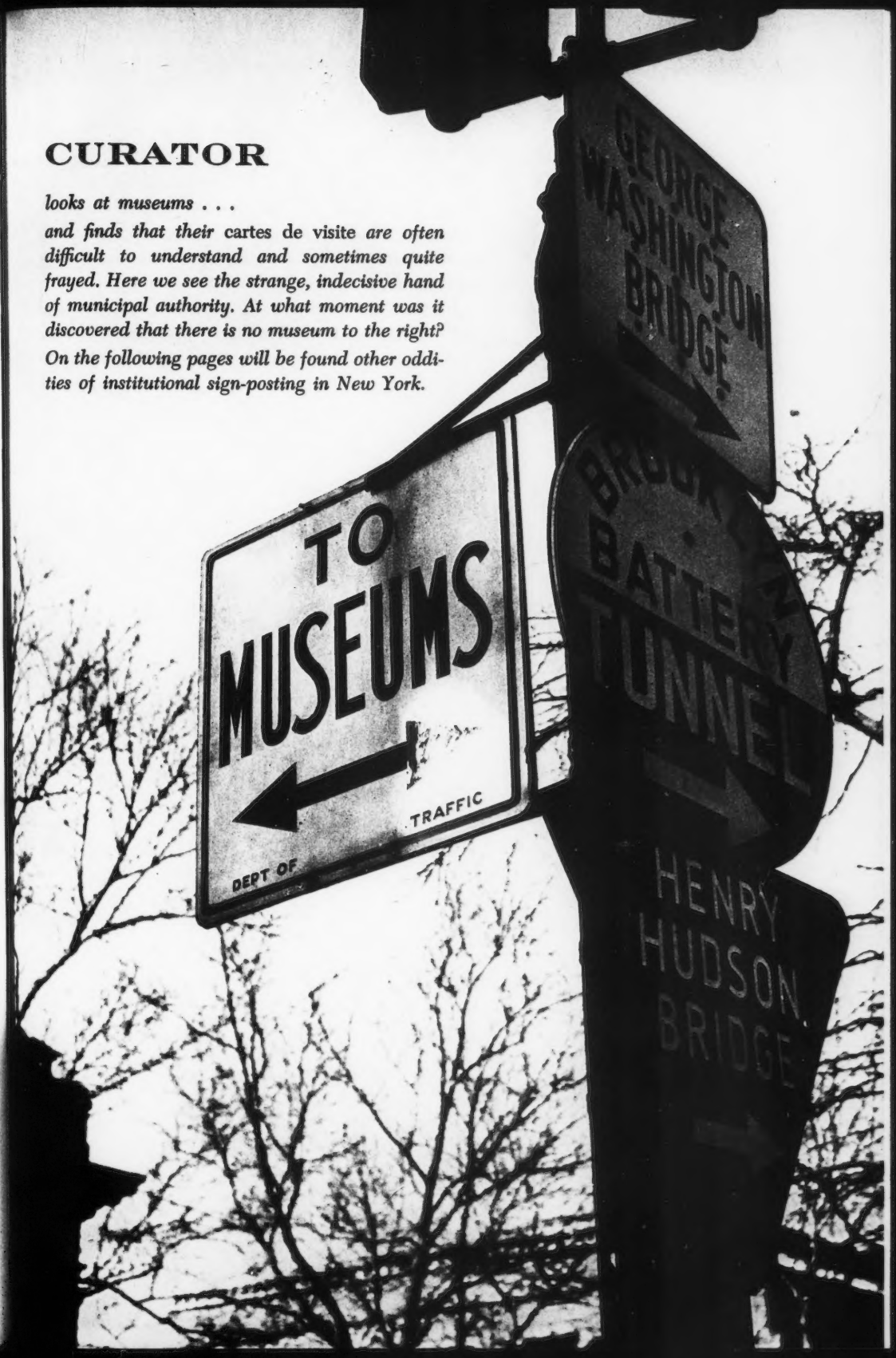
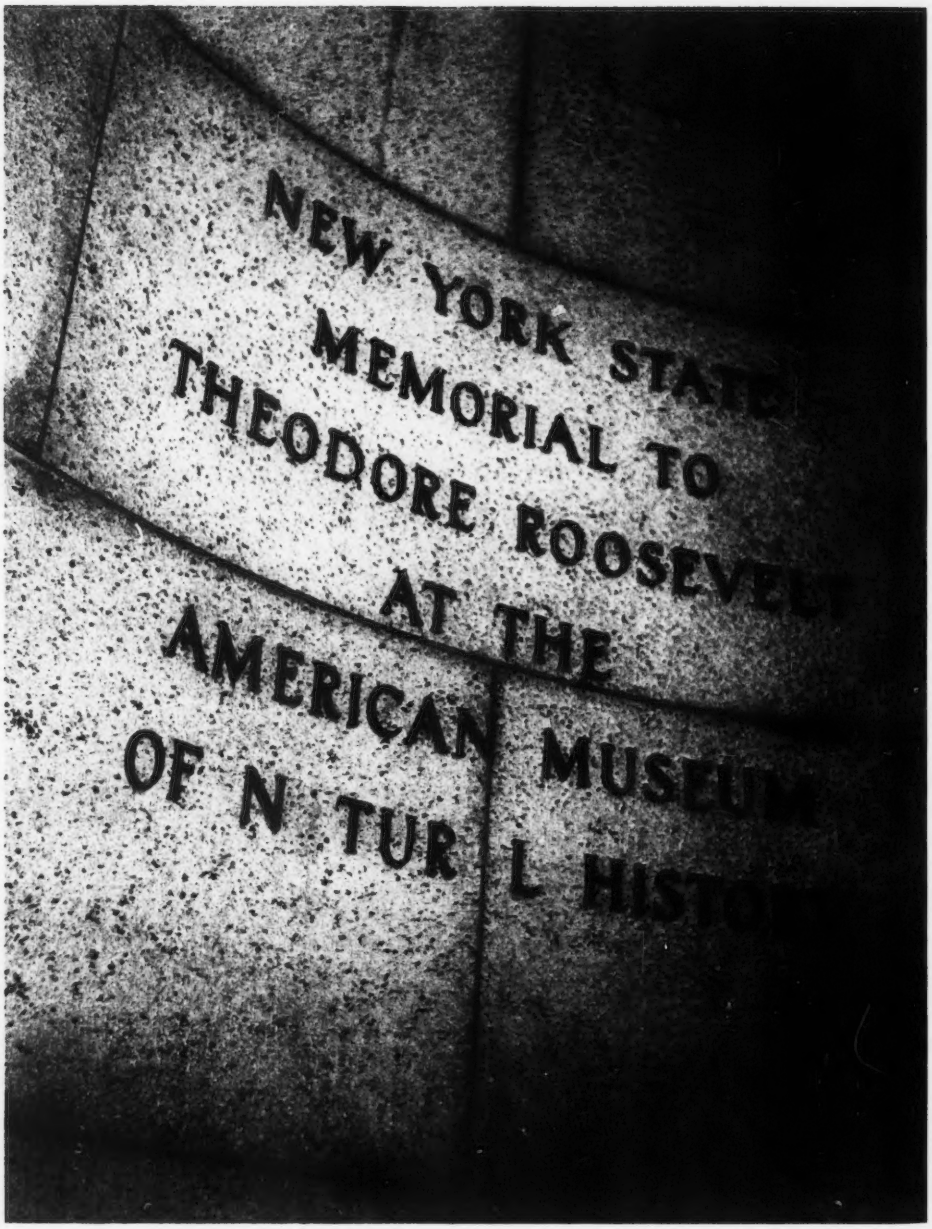
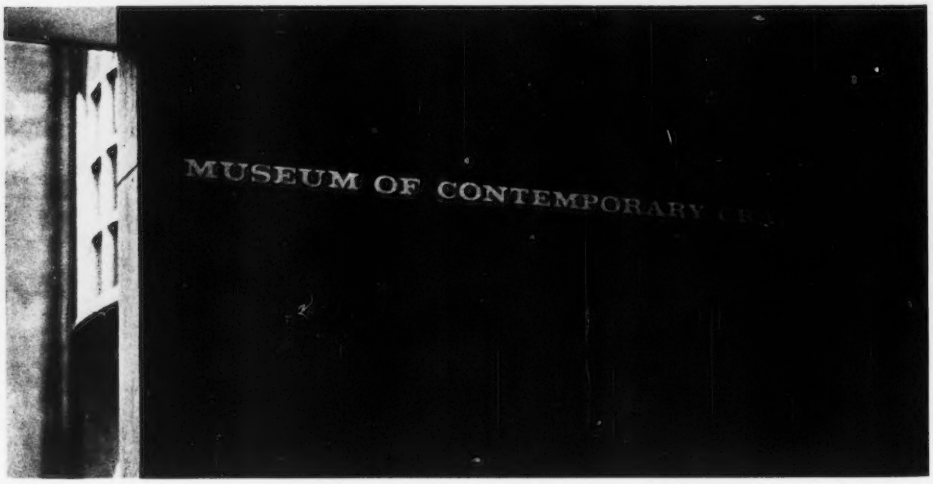


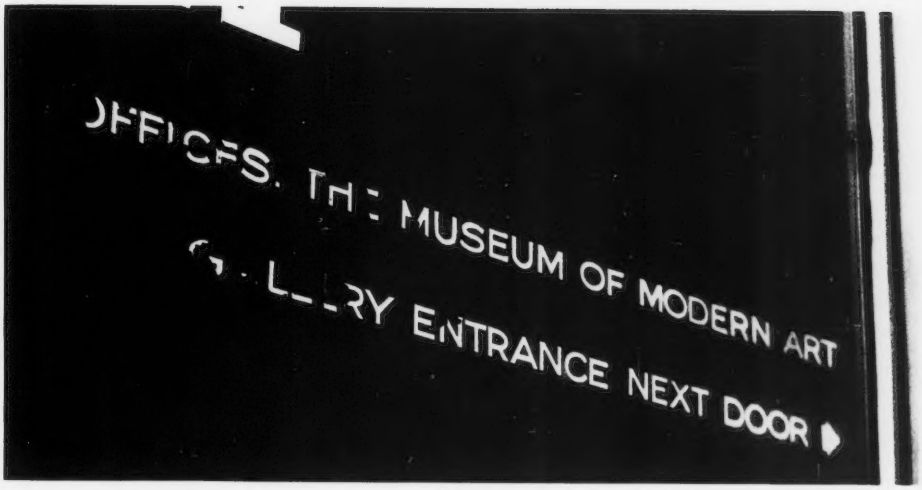


Two familiar museum signs are seen here: The monumental that is all too flimsily installed (above); *and the emergency, ever-so-temporary job the janitor did, that no one got around to doing over* (right). *It's a pleasure to meet the false apostrophe in such an elegant setting.*

CLOSED
SAT.-SUN.
HOLIDAYS

Museums can no more escape the vagaries of fashion than can any other human institution. Amusing proof of this is provided by two new establishments in New York which, though totally unrelated in activity, have chosen to use the same design of entrance lettering. It is a style much in fashion, at the moment, for the more austerely chic advertising layouts.





In a glass door darkly can be seen many facets of the letterer's art. Observe in the picture above the state, so quickly arrived at, that John Piper has referred to as "pleasing decay." Elsewhere, as seen below, some institutions are still determined to deny the existence of the letter U, even in a style of lettering that is woebegone contemporary, and owes no debt to the incising chisel.

Ownership of the largest museum sign-board in New York has been for some years beyond doubt (right). *The lettering even overshadows the splendid Germanic eagle that space exigencies have decapitated. Not so easy to track down, however, is the* smallest *entrance lettering* (above).

CURATOR cannot guarantee that its researches will always produce the oddest or the most curious. We invite our readers, therefore, to submit their own favorite pictorial evidence of museum eccentricities.

PICTURES AND TEXT BY GORDON REEKIE

Training Museum Personnel in a University

IRVING G. REIMANN, DIRECTOR, EXHIBIT MUSEUM
UNIVERSITY OF MICHIGAN

The range of duties and responsibilities in a modern museum is very great. In a large museum these may be divided among a hundred, or many more, people. In such a museum it is possible, and reasonable, to have experts whose interest and competence may be in one very specialized branch of knowledge. The proper care and advanced study of a great collection necessitates the undivided concentration of the curator, whose duties, though varied, are closely interrelated. In contrast is the very small museum whose one-man staff must be director, curator, exhibit technician, public relations man, activities supervisor, secretary, treasurer, docent, janitor and maintenance man. The majority of museums fall somewhere between these extremes, and the number of them whose staff members do not have to divide their efforts into several directions are few.

The role of the university in the disciplines which lead to doctorates in the arts, the natural sciences and history is clear. These are fields which provide careers in teaching or research. Ideally, the students know the area to which they expect to dedicate their lives, and prepare themselves for it. The ideal is not always realized. The fortunate ones find the niche for which they have prepared. The others may accept employment in related fields, such as general museum work, and some may relinquish their dreams to enter another, often more lucrative, livelihood.

We museum people must painfully acknowledge the generally low level of museum salaries. We are also seriously concerned with raising the standards of qualifications for employment in our profession. The problem immediately arises whether or not we can expect future museum workers to spend several years and thousands of dollars in graduate studies to prepare themselves for a job with substandard pay. Until the

problem of compensation commensurate with training is solved, we may have to capitulate and plan a course of study at the undergraduate level, perhaps combined with interneships or some other type of in-service training. Admitting the need for specific education and training of future museum workers, we must adopt a realistic approach to the matter, hoping most profoundly that in the not-too-distant future we may approach the problem idealistically.

To offer broad, basic museological training at the undergraduate level presupposes a desire in undergraduates to enter a museum career. It has been our experience at the University of Michigan, however, that the drift to museology rarely occurs except at the graduate level. We think that this may be because we are in a relatively small community, and there is no local museum which offers activities for children. Many of our confreres in the museum world received their stimulus from a childhood association with an active museum, and it is probably from such a source that a very large percentage of the college undergraduates who wish to concentrate in museology is derived.

Interest in museum training, and museum standards, has risen to a high pitch in recent months. Many opinions have been expressed which in essence agree with the necessity for insuring competence in future museum personnel, but which differ in the manner of providing the means, and the areas of emphasis. A brief survey of some of these opinions follows.

Dr. Hugo G. Rodeck, Director of the University of Colorado Museum, has very recently expressed his views at some length in a personal communication, from which I freely quote:

> I feel ultimately it will be to the university museums that such institutions (the very large museums) look for knowledgeable personnel. It was at one time thought that medicine could only be learned by apprenticeship in a doctor's office, or that a lawyer could only be trained by reading law in the office of some attorney. If museology should ultimately turn out to be a legitimate field of human activity, then I think ultimately museologists will need to be educated in our institutions of higher learning. They may not be thus prepared to be taxidermists or curators or artists but they will know what museums are all about. They can get their taxidermy training in the biology department or their art training in the art department or their curatorship in other appropriate departments of the university, but I do believe that university museums are in a favorable position for the education of museologists and their orientation with respect to the methods and the ultimate objectives of museums.
>
> . . . Ultimately we hope to set up a regular course of a year's duration devoted to the most complete possible exploration of museums, their purposes, their methods, and their accomplishments. This . . . would be an entirely academic course. By this I mean that it would not emphasize techniques so

much as ideas. There would be developed a thorough background in the history of museums in the world. It would involve a thorough knowledge of museums in existence today, with special emphasis on those of North America. There would be a broad investigation and understanding of techniques and methods, and museum operation, without at the same time any attempt to make the students expert in any one field of museum technique of a specialized type. This work will be on the graduate and upper undergraduate level. It would require as a prerequisite for entrance a major in one of our fields included within the range of museum presentation. We will expect an advanced or graduate major in geology, anthropology, biology, fine arts, or any one of a number of other areas that you might imagine. Each of these students would be required to have a clear understanding of the application of museum philosophy to all of these other fields as well as to his own.

In other words, you can see by what I have said that what I am driving at would be a course which would be primarily educational and cultural—introducing techniques, but only in so far as educational method needs to go in the early stages to give the student a background for discriminating between good and bad technical accomplishment.

Ideally, this work would be followed by an opportunity for a following year's interneship, during which each student would have an opportunity to explore the technical skills required by his own special professional interests.

As I have already said, for a variety of reasons we have not yet been able to implement these plans. However, at the present time I am giving an honors consultation course entitled "Museums in Culture." In this course, limited to ten exceptionally gifted and interested students, we investigate, read about, visit and discuss museums from the point of view of their objectives and accomplishments, and their place (both actual and potential) in our intellectual and cultural life. This group has turned out to be unusually interesting as well as interested, and it occurs to me that by such means we might not only develop, but also even recruit young people who might find a life work in museum activities. Moreover, even those students who have no vocational intentions toward museums find great interest and profit in an understanding of the present and potential position of museums in our educational, cultural and avocational lives.

In addition to all of this, I believe that through our student assistants in the Museum we have, over the course of years, served a very real and useful purpose in the advancement of museums. A very considerable number of our people have either gone into museum work or into jobs in which museum understanding and capability is peripherally useful. The others are, like the non-vocational honors students, aware of what museums are all about and awake to their potentiality with respect to both vocational and avocational contributions.

. . . The enormous variety of museums implies an equally wide variety of training content and methods. I do not believe that we should work for a stereotyped museum training course of national uniformity, any more than we should expect similar uniformity in any other of our educational institutions.

However, I do feel that we should be able to develop some method whereby competence among the younger members can be established before it might be proven in service. After a person has had an opportunity to develop his museum capabilities in actual service, a certificate becomes of less significance. Offhand, I hope that we will be able to give serious consideration to a scheme involving a nation-wide certification of museologists from a very wide variety of universities, colleges, *and* museums.

Dr. Rodeck places the strongest emphasis on educational and cultural aspects of study, both for the training of future museum professionals and for the intellectual breadth of the general student.

In contrast is the highly regarded State University of Iowa program under the guidance of curator Walter C. Thietje. Concentration is entirely on techniques. This is the oldest continuously offered museum training course in the country, and its graduates occupy many responsible positions in museums the country over. Seven courses are offered to both undergraduate and graduate students.

The Buffalo Museum of Science offers a training course in which the students spend varying amounts of time in each department of the museum, over a period of ten weeks. At the end of the general training period, the students may elect to work in the department of their choice at nominal pay. This course has recently been recognized by the University of Buffalo. The idea of this program is an excellent one, but the effectiveness depends upon the quality of the institution and the staff members. Only a rather large, very active, and well-rounded institution with a highly ranking professional staff could adequately undertake such a comprehensive program. A bachelor's degree was formerly a prerequisite of the Buffalo course, although it is now open to undergraduates at the University.

The *Midwest Museums Quarterly* for July, 1956, was devoted to "Training for Museum Work." Several of the authors hold university appointments, and their articles favor university training as preparation. In the following paragraphs I shall excerpt statements by some of these leaders in the movement for better training of museum personnel. Since the entire articles are available, only a few of the most significant statements will be quoted.

Dr. Arnold B. Grobman, Director of the Florida State Museum says, in part:

> There is no one best program . . . museums in America will benefit greatly by having available skilled persons with diversified training . . . we are not concerned here with the training of personnel for employment in the large museums . . . nor are we concerned about the training of preparators, artisans, and technicians. I regard the most pressing problem to be the effective training of personnel for museums that employ less than a half-dozen persons.

The personnel of the small museums has received far less training, appropriate to its responsibilities, than have the staff members of the larger museums.

Dr. Grobman continues, favoring a museum training program on a college campus where the student has cognate disciplines available for broadening his background. Admitting the lack of salary incentive to post-baccalaureate studies, he suggests as a compromise: the first two years of college to be devoted to courses designed to provide a broad foundation; the junior and senior years to include intensive work in subject matter fields related to the museum interest of the student; five single semester courses in a museum science department to include history, practice and methodology included in the program of the last two years; and apprenticeship in an off-campus museum during the summers of the last two years. Dr. Grobman expresses the hope that future up-grading of museum employment will enable museum training to be given at the graduate level "after the student has gained a rich educational experience."

Dr. Stephen F. deBorhegyi, director of the Stovall Museum of Science and History at the University of Oklahoma, raises his voice in the same issue of the *Midwest Museums Quarterly* in favor of broad training to equip the student to operate a small museum.

> The museum *worker* of today, whatever his capacity, faces a more exacting job than that expected of the museum *director* a few years ago. While museum techniques and goals have changed rapidly, schools have not been as quick to offer courses designed to train individuals to fill the new jobs. . . . where does one look to find a person trained as a museum coordinator, technician, preparator, public relations specialist, education or program specialist, or just all-round "jack-of-all-trades" museum man?

Oklahoma has offered a one semester course, which it hopes to expand into two semesters.

> The major aim of the course, as it is presented now, is to teach the students how to catalog, interpret and display scientific specimens of widely differing fields, and to give them a general understanding of the problems of modern museums (education, social activities, public relations, and museum administration).

I have a mimeographed copy of a talk presented by Dr. deBorhegyi at the American Association of Museums' annual meeting in Lincoln, Nebraska, last May. Selected from his introductory remarks are the following statements:

> At the moment there are many more positions open in museums than there are trained persons available to fill them. If these positions are filled by persons untrained in the museum field, we may find that we are building structurally unsound card-castles. . . . Although there are several excellent museum training programs offered by larger, metropolitan museums, there is no doubt

in my mind that the best program would be one coordinated with, and subordinate to, a four-year liberal arts curriculum. . . . Since museum skills can be developed through experience, they must not supersede in importance the broader and more general body of information which should be the property of every museum worker. . . . The first step to achieve a more uniform training program for museum personnel in the United States should be a closer relationship between the Council of the A.A.M. and those museums and universities that offer training programs. . . . the course of study to be outlined does not exclude those persons already engaged in the museum field who desire to learn special museum skills and broaden their knowledge of museum problems and procedures in general.

Dr. deBorhegyi developed the following points in some detail:

1. A standing committee on American Museum Training should be established. . . . 2. Those persons in charge of courses in museum training at universities and museums should submit their course synopses for accreditation to this committee. . . . 3. Any college course to be accredited by the A.A.M. committee should offer at least one year of undergraduate study in museum science (skills and techniques) and one year of graduate work (advanced museum techniques and administration). . . . 4. A student having completed at least one, and preferably two years of university work in museum science, or the equivalent thereof in a summer workshop . . . would be qualified to receive a certificate from the A.A.M. Students wishing to further specialize in museum work could complete further requirements for a diploma from the A.A.M. . . . 5. At least one year in-service training should be required for a diploma from the A.A.M. . . . 7. For the sake of those students attending universities which do not offer museum science courses, or for those persons who are already museum employees and who wish to acquire a diploma from the A.A.M., a system of summer workshops may be established. . . . 9. For a proper standard of evaluation of museum trainees, a special examination by members of the Museum Training Committee of the A.A.M. is essential.

Regardless of the arguments for or against Dr. deBorhegyi's proposals, he obviously visualizes a different kind of museum association than now exists in this country.

Dr. Carl E. Guthe has had a more intimate close-up of more museums in the United States and Canada than anyone else, and has made special studies of their problems. In response to my request for his highly valued opinion he prepared the following statement:

My experiences of the past four years have convinced me that there are two great weaknesses in the museum movement in our country and in Canada. The first is the failure on the part of museum workers to interpret adequately the objectives and functions of museums in our modern society. The small community museums, the majority of which are history museums, are the worst offenders. The university and college museums, as a group, are a close second in this matter. The second weakness is the failure on the part of most small museums to keep definite and complete records on the materials in the collec-

tions. These observations cause me to make the following "few concise remarks" on the subject of museum training.

The competent management of large and small museums capable of performing their unique functions as social instruments in our modern society requires both academic and practical training. Such training can be given only in universities possessing, or closely affiliated with, adequate museum facilities. A professional museum worker should have a broad academic training in a number of closely related subject matter fields, supplemented by specialized training in museum theory and practice. A training school for museum workers should be oriented to supply staff members for the small community and college museums, which far outnumber the larger museums with diversified staffs. Museum staff members must be thoroughly familiar with museum theory—that is, with the history, objectives and functions of modern museums in our competitive society. They must recognize that the first obligation of any museum is to maintain accurate, complete and practical records of the materials in the collections. They must be made to realize that the success of any museum in our modern society depends upon the realistic and popular interpretation of the objectives and policies of the museum as a cultural institution designed to meet the needs of the community it serves. The required training in all three of these subjects is essentially academic in nature, consisting of lectures and seminar discussions.

This type of fundamental orientation in museum work should then be supplemented, in accordance with the needs and desires of the student, by technical and laboratory training in the great variety of mechanical and artistic activities which are essential in good museum management. It may be found necessary to require students in training to specialize in only one or a few of the many crafts and techniques used in museum work. No one individual can possibly be an expert in all of these. However, all students should be sufficiently familiar with all of the crafts and techniques to understand the problems involved and the objectives sought.

This brief survey of the opinions of some of our younger and older museum administrators and teachers certainly shows a near-unanimity of reaction toward the problems of museum training. In a nutshell: salaries are too low to enable us at present to demand training at the doctoral level; an academic background with emphasis on at least one field of endeavor represented by museums, plus general museum training, is essential; the greatest need is in training personnel in the operation and administration of the very small museum; museum training which fails to emphasize the responsibilities of the museum to the community is an empty package wrapped with tinsel.

There seems to be little room for doubt that universities equipped with modern museums are the most suitable instruments for providing basic museum training in combination with the academic cognates requisite to assure an acceptable foundation for a museum career. Universities without progressive museums or museum staffs can collaborate with

off-campus museums when such are available, as practiced (or planned) in New York City, Buffalo and Chicago. Indeed, in many matters of advanced techniques, only the great museums are furnished with the equipment and personnel to provide training. This, however, is not germane to the present discussion, which has been an effort to ascertain, through the opinions of highly qualified museum experts, the minimal requirements for preparation for a museum career. Of special significance is the consensus that emphasis on techniques be subordinate to breadth of understanding and general knowledge of museum functions and potential.

Formalized Planetarium Courses

FRANKLYN M. BRANLEY, ASSOCIATE ASTRONOMER

AMERICAN MUSEUM–HAYDEN PLANETARIUM

The launchings of Sputniks One and Two prompted President Eisenhower's messages on technology and science, messages that have more sharply focused the attention of the public upon the nationwide need for broader and more effective science education. It is appropriate that all institutions which can assist in meeting this need should reappraise their functions to ascertain if they are as effective as they could be and ought to be.

Planetariums have an important role to play in the development of science-mindedness in the public. When the public becomes aware of the implications of science for the maintenance of a high standard of living and, indeed, for survival itself, they will demand that science be given its rightful status in the educational curricula of elementary and secondary schools and they will promote salutary attitudes toward science in their family groups. It has become increasingly apparent that young people are not always making wise choices when they are entirely free to select those subjects which they will study in high school. To a large measure, educators are allowing youngsters to determine what a school shall offer, which implies that educators are allowing these same youngsters to shape and mold the nature of civilization itself in the years to come. Freedom is the keystone of our way of life, and there should be some freedom in our educational system; but freedom is for those who assume responsibility. Freedom without responsibility is license; it leads to chaos and destruction.

People make wise decisions when they have a background of experience and knowledge. It is essential that young people and their parents should appreciate the meaning of science, that they should be inspired by its subject matter and by its implications.

The basic purposes of the American Museum–Hayden Planetarium are to elucidate these meanings and understandings, to present facts and ideas of astronomy in a dynamic manner, and to open up new avenues of thought. A planetarium is a unique educational organization that blends together entertainment and learning, and by so doing stimulates thinking and establishes desires to know.

An important operation of the Planetarium is provision of ways in which this curiosity can be satisfied and further stimulated. As part of our welcome of audiences to performances, we show a slide stating that courses in astronomy, navigation and meteorology are offered by the Planetarium, and audiences are directed to ask at the box office for a catalogue that describes the various courses. The largest number of our registrants learn about the courses in this manner. However, we also send out press releases which many papers pick up, we place posters in libraries, schools, business offices, and other strategic locations. In addition, members of the staff use every opportunity to mention our courses in their public lectures and in their radio and television appearances.

These mediums of communication, together with word-of-mouth advertising, have been effective in acquainting the public with our various courses. The totals given below indicate the extent of our formal class operations for the years indicated.

	'53–'54	'54–'55	'55–'56	'56–'57	1957 (last half)
Astronomy for the Family	50	72	33	49	71
Star Identification	34	35	30	30	44
Introduction to Astronomy	56	72	107	123	51
Stars and the Galaxy	...	...	...	36	11
Astronomy Seminar	...	...	...	8	9
Introduction to Celestial Navigation	112	86	45	123	29
Advanced Celestial Navigation	...	39	13	13	not offered
Navigation in Coastal Waters	...	...	...	47	27
Meteorology	27	26	23	19	14

The content, viewpoint and age level for each of the formalized courses given at the Planetarium at the present time is summarized briefly below.

ASTRONOMY FOR THE FAMILY. This course meets on ten consecutive Saturday mornings for forty-five minutes. All lectures are held in the dome where the Zeiss instrument can be used to clarify points developed by slide projection. Topics included are: sun, planets, earth, moon, asteroids, constellations, the Milky Way galaxy. Obviously, each topic

can be treated only sketchily because of time limitations. We encourage parents to attend the lectures with their children. The course is designed to meet interests of children eight through fourteen years of age. Because of this great range in age level, no single reference can be given. It is more effective to make suggestions to individuals whose reading level, background and general ability have been determined.

STAR IDENTIFICATION. This is an adult course that meets for ten one-hour sessions from October through December. All meetings are held in the dome, where the Zeiss instrument is used extensively. Stars of the seasonal skies are discussed, as are also stars north and south of the equator. During the current sessions considerable stellar astronomy is presented, together with considerable background of the mythological legends associated with individual stars and star groups.

INTRODUCTION TO ASTRONOMY. This is our most popular course. It meets once a week in the evening for ninety minutes and is a general survey of astronomy during which various aspects of the solar system, the calendar, the stars and galaxies are discussed. Many students who take this course repeat it later to clarify basic information, or go on to more advanced treatments of the subject. Telescopes are set up on the Planetarium lawn, whenever sky conditions warrant their use. Such occasions are rare, however, because the skies are either cloudy or smoky, smoggy or filled with light.

STARS AND THE GALAXY is a course in intermediate astronomy which considers in detail the methods astronomers use for determining the nature and appearance of stars and the Milky Way galaxy. The instructor often finds that the class wishes to pursue in more detail various topics that were treated in their introductory work. These topics may have been originally discussed in a Planetarium course or in some work taken at the undergraduate level.

ASTRONOMY SEMINAR. There are many students who desire to explore further certain specific problems or areas of study. The seminar approach allows a limited number of students to do this under the guidance of different members of the Planetarium staff. The class is conducted as a true seminar; that is, students explore individual problems and present their findings to the group, which may then discuss the presentation. Problems which have been explored during past seminars are: solar prominences, energy of the sun, satellites of Jupiter, atmospheres of the planets, aurora and airglow, mechanics of the solar system.

INTRODUCTION TO CELESTIAL NAVIGATION. This course, and the advanced section as well, appeals to airline personnel, to yachtsmen, to men and women who are engaged in the manufacture and sale of navigation equipment, and to private individuals who have use for such specialized knowledge. The course meets for ten ninety-minute sessions, and runs

through both the fall and spring semesters. The Planetarium dome is used extensively to clarify the celestial triangle, celestial lines of position, the observing of celestial bodies, fixes by the stars. Practice with H.O. 214 (Hydrographic Office Publication #214) and the American Nautical Almanac is an integral part of the course.

NAVIGATION IN COASTAL WATERS. This course, which meets for ten ninety-minute sessions, is designed for present and prospective owners of small craft, or for those interested in beginning a complete program in navigation. Emphasis is placed on practical problems relating to the use of charts, compasses, aids to navigation, and methods of safe piloting. Specific topics include charts and tools, buoyage system, compass and compass error, plotting lines, the running fix, current vectors, time, speed and distance. A large percentage of class time is devoted to the solving of practical navigation problems.

METEOROLOGY. This course, which meets for ten ninety-minute sessions, helps the layman understand the causes of weather, the meaning of forecasts, the science of measurement and forecasting. Films and slides are used extensively to present topics such as: the ocean of air, wind and water, air masses and fronts, clouds, storms, hurricanes and tornadoes, measuring and forecasting.

SPECIALIZED COURSES. The New York City school system is in the process of incorporating a dynamic science program into its curriculum of elementary education. Many of the teachers who will be implementing this program have very little, if any, background in science. The Planetarium has redirected its presentation for teachers to develop the relationship of astronomy to the rest of the curriculum, and to give the teachers the security and confidence that comes from a background of knowledge. The learning of facts is considered important, for thinking cannot take place in a vacuum; the mind demands data to work with. However, the facts are related to all-pervading concepts, which astronomy is uniquely fitted to develop: the idea that change is a continuous condition of the universe; the tremendous variety there is in the stars, galaxies, nebulae and other components of the universe; appreciation of time and space; the interrelationships between planets and satellites, planets and the sun, the sun and stars, stars and galaxies.

This is an in-service education course which is now accepted for full credit by the Board of Superintendents of New York City. It meets in two-hour sessions that continue through fifteen weeks.

ASTRONOMY IN ELEMENTARY AND SECONDARY EDUCATION is a course that is given in cooperation with colleges and universities. The course is designed for teachers who are working toward advanced degrees. Arrangements for this course are under discussion with educational institutions in the area, and we hope to offer it in our regular schedule during the

next school year, or possibly to inaugurate it during the summer of 1958.

DESCRIPTIVE ASTRONOMY—COLLEGE LEVEL. There are scores of undergraduate schools in the metropolitan area which do not offer astronomy, primarily because of lack of personnel and/or lack of equipment. The Planetarium feels that many students in these institutions would study astronomy if an opportunity were presented. Therefore, the Planetarium has set up a course in astronomy on the college level. It meets for a total of forty-five hours, and carries three points of credit. Registration for the course is through the cooperating university or college.

SPECIAL PROGRAM FOR COLLEGES. This program consists of single lectures, or series of lectures, that are developed after consultation with the college instructor. The program meets the needs of schools that offer astronomy as a course in a general education program, or astronomy as part of a survey of the physical sciences, civil engineering and surveying.

This program has expanded considerably in the past few years, and indications are that more and more institutions will take advantage of this service in the future.

THE SKY EXPLORERS is a series of lectures for young people at twelve noon on Saturdays throughout the year. Attendance at the lectures is by reservation. Topics treated include the solar system, the stars, the Milky Way and other galaxies. These lectures provide the basic information for qualification in astronomy for such groups as the Girl Scouts, Boy Scouts, Camp Fire Girls, Catholic Youth Organization. Annual attendance is approximately six thousand young people.

POPULAR SCHOOL COURSES. In addition to the above courses, which are organized formally, the Planetarium has an ambitious program that appeals to school groups. The current popular show is presented each morning to groups of children who have made reservations ahead of time. In the course of a twelve-month period, this program has an attendance of 85,000 youngsters and their teachers, at a conservative estimate. While the special projection and sound effects of the popular show are used in these shows for young people, the lecturer modifies his approach to meet the interests and backgrounds of the youngsters.

In addition to giving constant attention to the consideration of courses which can be planned for the future, the Planetarium is sensitive to the needs of the community—those needs which may develop because of current happenings. On October 17, 1957, for example, less than two weeks after Sputnik One was launched and the age of space began, the first meeting of a special lecture series on man-made satellites was given to a subscription audience of some 300 newsmen, housewives, television and radio people, businessmen. The series was eminently successful—so much so that it is being repeated in early 1958 and may well become an on-going part of the standard course offering.

The various courses are taught for the most part by the regular staff members of the Planetarium as part of their regular duties. However, instructors in colleges and universities in the area are also invited to teach. They bring in ideas which are often incorporated into the Planetarium's educational philosophy. Thus, the procedure is a dynamic one, and, we believe, always improving.

It is our hope that the educational programs of the Planetarium perform at least two important services in addition to the basic service of partially satisfying man's insatiable curiosity about the world he lives in. First, the Planetarium tries to engender science interests in young people that will stay with them as they mature. Second, it attempts to help adults understand the place of science in their daily lives, so they can more intelligently influence the legislation on which the future depends.

Proposals for a Standardized Museum Accessioning and Classification System

STEPHAN F. DE BORHEGYI, DIRECTOR, AND
ALICE MARRIOTT, ACTING CURATOR OF ETHNOLOGY
STOVALL MUSEUM OF SCIENCE AND HISTORY
UNIVERSITY OF OKLAHOMA

Each museum has its own problems. Each shares some of them with other museums, and has some that are never duplicated. The Stovall Museum of Science and History, at the University of Oklahoma, Norman, Oklahoma, has an unusual number of problems in common with other museums, for it is a general museum, intended for both teaching and display; using and working with innumerable specimens from several other University departments, and relying to a large extent on curators from these departments—persons without specialized museum training—for staff members. In addition, it serves the city of Norman as a community and regional museum, and is one of the community resources used by study groups in Oklahoma City, twenty miles away.

For all these reasons, we feel that the simple specimen identification system in use at the Stovall Museum of Science and History may be of interest and use to other general museums and to university museums in particular. This system has as its major aim making specimens available to students of the University of Oklahoma and to the staff of the museum with a minimum expenditure of effort and time. The system can be worked, experiment has convinced us, by anyone who knows the alphabet well enough to look up numbers in a telephone directory.

At our University, it has been found necessary to have departmental curators handle the accessioning of material in their divisions. In other

CURATOR

STOVALL MEMORIAL MUSEUM
UNIVERSITY OF OKLAHOMA
NORMAN, OKLAHOMA

Accession No.: E/53-4/6/1
Loan No.: None
Previous No.: None
Catalogue No.: NAM-13-8-1

ACCESSION AND LOAN SHEET

(IN CASE OF SEVERAL ITEMS USE REVERSE SIDE OF SHEET)

DIVISION: ETHNOLOGY DATE: 7th May, 1954

STORED: Basket case No. 1 TYPE OF ACCESSION: Gift
(Gift, purchase, loan, exchange, collected in field)

PURCHASE REQ. NO.: None

NAME AND ADDRESS OF INDIVIDUAL OR FIRM WHO DONATED, COLLECTED, LOANED OR SOLD THE MATERIAL:

Bryson City Women's Club,
Bryson City, North Carolina

COLLECTED BY: Mrs. J. D. Bryson DATE COLLECTED: 1953

ITEM OR ITEMS: Cherokee basket TOTAL NO.: 1

LOCALITY: Southeast United States (North Carolina)

DESCRIPTION: Utility basket, berry-picking type. Made of plaited split wild cane with a hickory-withe handle. Background cane bleached but undyed; decorative elements dyed with walnut bark. Designs: Simple checker-board around top of basket; band of herring-bone around sides; band of small triangles at base. 5½" high, top 9" x 6½"

HISTORY, IF KNOWN: Collected by club as part of Roberta Campbell Lawson Memorial Collection assembled by General Federation Women's Clubs.

REMARKS: Excellent specimen in good condition. Type becoming obsolete. Use for display or museum study only; do not release in loan collections.

CONDITION AT DATE OF ARRIVAL: Good

Accepted by: SFB Date when copy was sent to Division:

Approved by: SFB

Acknowledged by: AM

~~letter~~, form, card, in person. Returned in good condition:

Date of acknowledgment: 15th May, 1954 Date:

Fig. 1a. Accession and loan sheet form used in three colors. White sample retained in museum's central office. Blue sheet is placed in alphabetical order in our donor file. Pink sheet remains with the department curator, who handles the successive accessions for that department.

PREVIOUS CATALOG NOS.	ACCESSION NOS.	CATALOG NOS.	DESCRIPTION MEASUREMENTS, LOCALITY, ETC.	REMARKS CONDITION, ETC.	PLACE OF STORAGE

Fig. 1b. Reverse side of accession sheet is used in the event of several items being accessioned.

words, because of its diversity in many scientific fields, our museum has no single, official registrar, but each department supplies its own part-time curator from its own staff, and each departmental curator, in turn, acts as the registrar for his department. Specimens may be brought directly to the museum from the field, or may be taken to the department office or storehouse for accessioning. In either case, accessioning must take place as soon as possible, and the specimen in question is not considered a part of the museum collection, in any department, until it has been accessioned.

Accession records are threefold, typed on white, blue, and pink sheets which are identical in every respect except color. The white is the original sheet, and is retained in the museum's central office, as part of the museum's permanent, official accession record. The blue sheet, a first carbon, is placed in alphabetic order in a special correspondence file folder labeled with the name of the donor or seller concerned. In this way, copies of all records pertaining to any one collection can be filed and kept together. If at any time it is necessary to compare a donor's or seller's description or information on a specimen with other records, this can be done quickly and easily. The pink sheet remains in the hands of the department curator who handles the successive accessions for that department. He is thus supplied with a running record of the materials in his department, and the same record is available to others in the department when and as it is needed. (Figs. 1A and 1B)

The data recorded on the accession sheets is obtained from correspondence, field notes, and interviews with donors or sellers of specimens. Further details, of course, are gathered from inspection of the specimen itself: size, color, rareness, etc., and from examination of the reference and comparative material in the Museum and University libraries, and in the museum collection. All this research is done preliminary to the actual

cataloguing of the specimen, so that all available records may be as complete as possible from the beginning. Another reason for starting with the specimen research is that museum staff members have noted in the past that when such research is left undone until the specimen is put on display, the reference work is seldom, if ever, completed.

So, then, when the entry is made in the accession book, the article is tagged or marked with its accession number, and information concerning the specimen is part of the museum's permanent record. Marking tags are used only when there is no convenient or practical way of otherwise marking the specimen, as in the case of basketry or small pieces of jewelry.

The accession numbering system in use is a very simple one, in order, as has been said, to be equally usable by the department concerned or by the permanent staff of the museum proper. The first unit of the number is that of the museum department to which the specimen is assigned; i.e., A=New World Archaeology, C=Classical (European) Archaeology, H=History, E=Ethnology. (Figs. 1A and 1B)

The letter symbol is followed by a digit unit signifying the academic year in which the specimen was received: 50–1 means that the piece reached the museum during the academic year 1950–1951. This symbol, in turn, is followed by a digit signifying in which of the year's collections

Fig. 2a. Catalogue card–Note Human Relations Area Files numbers in the lower right corner. 285: Mats and basketry. 415: Utensils, Food containers. 314: Forest Products–dye staff.

GIFT

MUSEUM OF THE UNIVERSITY OF OKLAHOMA

DIVISION: ETHNOLOGY
COUNTRY: USA
CULTURE OR TRIBE: Southeast - Cherokee

CAT. NO. NAM-13-8-1
ACC. NO. E/53-4/6/1
OLD NO. None

RECEIVED FROM: General Federation Women's Clubs
ADDRESS: Washington, D.C.

COLLECTED BY: Bryson City Women's Club
ADDRESS: Bryson City, North Carolina

DATE OF RECEIPT: 7th May, 1954

DATE OF COLLECTING: 1953

ITEM: Berry basket

IDENTIFIED BY: Donor; A. Marriott

DESCRIPTION: Split wild cane; plaited; rim braided; hickory withe handle; cane natural, some dyed with walnut bark. Simple checkerboard at top of basket, band of herring-bone around sides, small triangles at base

AGE: 1953

MEASUREMENTS: 5½" high; top 9" x 6½"

ESTIMATED VALUE: 2.50

NAM-13-8-1 (E/53-4/6/1) Cherokee berry basket - 1 Wild cane, hickory, walnut bark dye

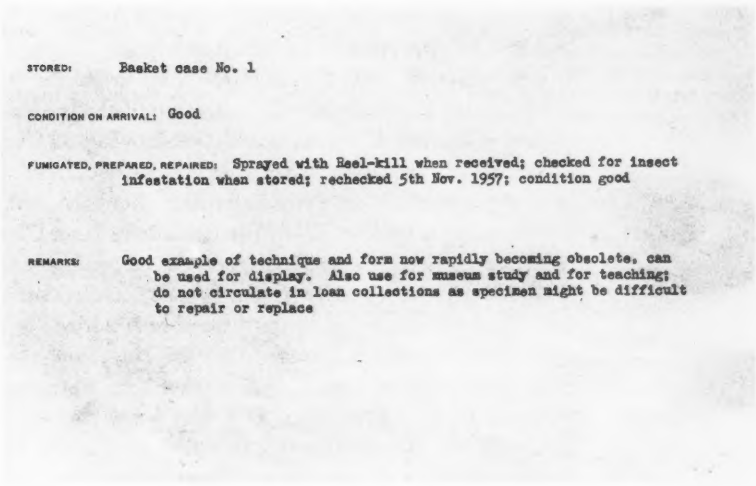
the specimen was included: E/50–1/3 means that the specimen was in the third ethnological collection to reach the museum in 1950–1951. The final unit of the accession number identifies the piece itself: E/50–1/3/12 =the *twelfth* specimen in the *third* ethnological collection received by the museum in 1950–1951.

The merits of this system have become even more apparent with use than they were when first suggested. The system is simple and workable; graduate and undergraduate students can follow it without difficulty; the system makes it possible for staff members to locate specimens before cataloguing has been completed, if necessary.

The next step in preparing the specimen for use, naturally, is classification. The classification numbers in use in the cataloguing system in our museum are based on the code numbers used in the *Human Relations Area Files*. Therefore, they are based on a code system available to museum workers anywhere in the United States, and one that can easily be accepted as standard.[1]

[1] Murdock, George P. et al.: *Outline of Cultural Materials*, 3rd revised edition. Human Relations Area Files, Inc. Vol. I. New Haven, Conn. 1950; *Outline of South American Cultures*, Human Relations Area Files, Inc. Vol. II. New Haven, Conn. 1951; *Ethnographic Bibliography of North America*, Human Relations Area Files, Inc. Vol III. Conn. 1953.

Fig. 2b. Reverse side of catalogue card.



STORED: Basket case No. 1

CONDITION ON ARRIVAL: Good

FUMIGATED, PREPARED, REPAIRED: Sprayed with Raid-kill when received; checked for insect infestation when stored; rechecked 5th Nov. 1957; condition good

REMARKS: Good example of technique and form now rapidly becoming obsolete. can be used for display. Also use for museum study and for teaching; do not circulate in loan collections as specimen might be difficult to repair or replace

Briefly, this classification system is based on the culture area concept. Specimens are first assigned a letter determined by the country of origin: i.e., NAM = North American Indians; CAM = Central American Indians; SAM = South American Indians, and so on. This general over-all system for continent of origin is followed by a second symbol to identify the culture area within the continent: NAM–1 = Arctic Coast of North America; NAM–2 = Mackenzie-Yukon Area; NAM–3 = Northwest Coast; NAM–4 = Oregon Seaboard; NAM–15 = Southwestern United States, etc. A further subdivision on the basis of tribe is then used: NAM–1–1 = Aleut; NAM–1–2 = Baffinland Eskimo; NAM–1–3 = Caribou Eskimo; NAM–1–4 = Copper Eskimo; NAM–15–15 = Jumano and Suma; NAM–15–21 = Navaho; NAM–15–24 = Papago, etc. (See *Human Relations Area* Files, Vols. II and III.)

Again, this is a simple and workable system, and its simplicity and workability are its greatest recommendations for general use. An additional recommendation is the system's derivation from a single and generally available source. There is nothing esoteric or difficult about either the derivation or the application of this system, and that is the reason the Stovall Museum of Science and History has adopted it. It has the additional value of being applicable not only to ethnological material, but to that in the fields of archaeology, history, mineralogy, and paleontology—in fact, of any department.

The classification number is added, as soon as it has been determined, to the accession number which has already been placed on the specimen or its attached tag. The specimen itself can then be handled as much as necessary; it can be cleaned, fumigated, repaired, etc., as desired, or it can be shelved in the storeroom until it is needed for study or display. All pertinent information concerning the specimen is on record and available to the department cataloguer.

The catalogue record cards are typed from the information in the accession book, with further examination of the specimen by the curator of that collection, if that seems desirable. (Figs. 2A and 2B) It will be observed that the lower left and upper right corners of the cards carry both the accession and the classification numbers, with the classification number appearing first. When the cards have been filled in, the information having been transcribed from the accession book, they are filed in Cardex file cases *numerically by classification number.* At the time that the cards are typed, a third number is added for further identification. This follows the statement at the bottom of the card concerning tribe, material, and object, and is based on function: 41 = Tools and Appliances; 32 = Processing of Basic Materials; 77 = Religious Paraphernalia, etc. The number is intended as a quick identification guide for any one using the catalogue. These numbers, also, are derived from the

Human Relations Area Files, and can therefore be accepted as standard and available throughout the country.[2] (Fig. 2A: lower right corner. 285 = Mats and Basketry; 415 = Utensils, Food Containers; 314 = Forest products, Dyestuffs)

The master card file, then, contains the same information as does the accession book, differently arranged. The accession book is chronological; collections are listed in a given year, identified by order of receipt and their donors' names. The master, or catalogue, file card is essentially part of a culture area file, with all the materials and their uses from each area and each tribe in the area numbered and arranged by identification numbers.

However, the museum receives many requests from instructors, students, and visitors to the university for information by *type*: baskets, stone implements, etc., or by subdivisions of types: coiled baskets, obsidian knives, etc. There are also requests for objects by functions: cooking utensils, engraving tools, cradles, etc. It is sometimes necessary for a museum worker to be able to determine whether material from a given tribe is in the collection without resorting to the culture area file.

In order to make information in all these categories more readily available, a third file is in use. This is a flash-card cross-reference file, in simple alphabetical arrangement. The file is in two sections, one listing articles by tribe and one listing them by function. Each section is cross-indexed; that is, when more than one name is in use for any given tribe or group of tribes, a cross-reference card is employed: e.g., "WESTERN APACHE, see, SAN CARLOS APACHE; WHITE MOUNTAIN APACHE." (Fig. 3) Identifiable

[2] Murdock, et al. Vol. I. pp. iii–ix. Another important merit of the adoption of the Human Relations Area Files number codes for museum purposes lies in the fact that it can easily be adapted to punch-cards for any computer machine system (IBM 650 type). In a world of automation and with the rapid growth of museum collections, the advantages of such rapid machine sorting systems need hardly be stressed. The Varitype duplicating of punched catalogue card information is inexpensive, and to facilitate research, duplicate files can easily be exchanged among museums and universities for any group of specimens, designs or art forms.

Fig. 3. Tribal reference card. *Figs. 4, 5. Specimen reference cards.*

BASKETS — PLAITED
Tribe and Area: Southeast US — Cherokee
Object: Berry basket
Classification, Catalog, and Accession Numbers: NAM-13-8-1; E/53-4/6/1; 1
Stored or Displayed: Basket case No. 1

BASKETS — UTILITY
Tribe and Area: Southeast US — Cherokee
Object: Berry basket
Classification, Catalog, and Accession Numbers: NAM-13-8-1; E/53-4/6/1; 1
Stored or Displayed: Basket case No. 1

CHEROKEE
Tribe and Area: Southeast US — Cherokee
Object: Berry basket
Classification, Catalog, and Accession Numbers: NAM-13-8-1; E/53-4/6/1; 1
Stored or Displayed: Basket case No. 1

material from each group is then listed under the name of the specific tribe. "See also" cards are employed in a limited number of cases: "NAVAHO see also PAIUTE," for the use of workers who do not know that the so-called "Navaho wedding baskets" are usually of Paiute manufacture. All material from any single tribe is thus available under the tribal name or names.

The specimen subject file is much more detailed than the tribal listing file. (Figs. 4 and 5) A given specimen is listed under several headings; i.e., the Navaho wedding basket already referred to would be listed under the general heading: BASKETS—CEREMONIAL; under COILED BASKETRY; under VEGETABLE DYES—BASKETS; and under the name of the tribe making the basket, PAIUTE. Each additional file card that is made is listed on the back of the master Cardex file card, *in pencil*, so that additions to or withdrawals from the specimen shelves and the files can be made with a minimum expenditure of time and effort.

As new headings are added to the file, the cataloguer types additional cards, bearing only the headings, and adds them to the Heading Master File for quick reference. In this way contradictions, over-lapping entries, and duplicate cards in the flash-card files are avoided. The Master Heading File also lists all cross references made and, we need hardly say, is kept in strictly alphabetical order.

It will also be noted from the samples that the information given on the flash cards is greatly condensed from that on the master file card and in the accession book. This condensation was decided on to reduce typing time and to simplify the use of the subject file by untrained workers. After all, the subject file is intended only for quick reference use. When more detailed information about a given specimen is needed, it can be obtained from either the master card file or the accession book, since both classification and accession numbers are included on the cross reference file cards.

Detailed subject headings for functions, materials, classes of objects, etc., have been derived from the *Human Relations Area Files* (Vol. I). They are as applicable to photographic and other pictographic records as they are to the specimens, and the same system is in use for handling our visual material as is applied to specimens. (Fig. 6) Again, there is one great advantage in using this method: the student or untrained worker learns only *one* method for locating material of any character when it is needed, instead of being compelled to learn a different system for each category. Since the *Human Relations Area Files* were first developed to index bibliographic material, this means that all the reference and informational material on any culture area or topic in the museum can be found in a single operation. (See *Human Relations Area Files,* Vols. II and III.)

We do not expect or intend that the subject heading lists that form the basis of the system that has just been described will ever be closed. The whole point of any quick reference system is its flexibility. If categories were closed, this flexibility would be lost, and the cross reference

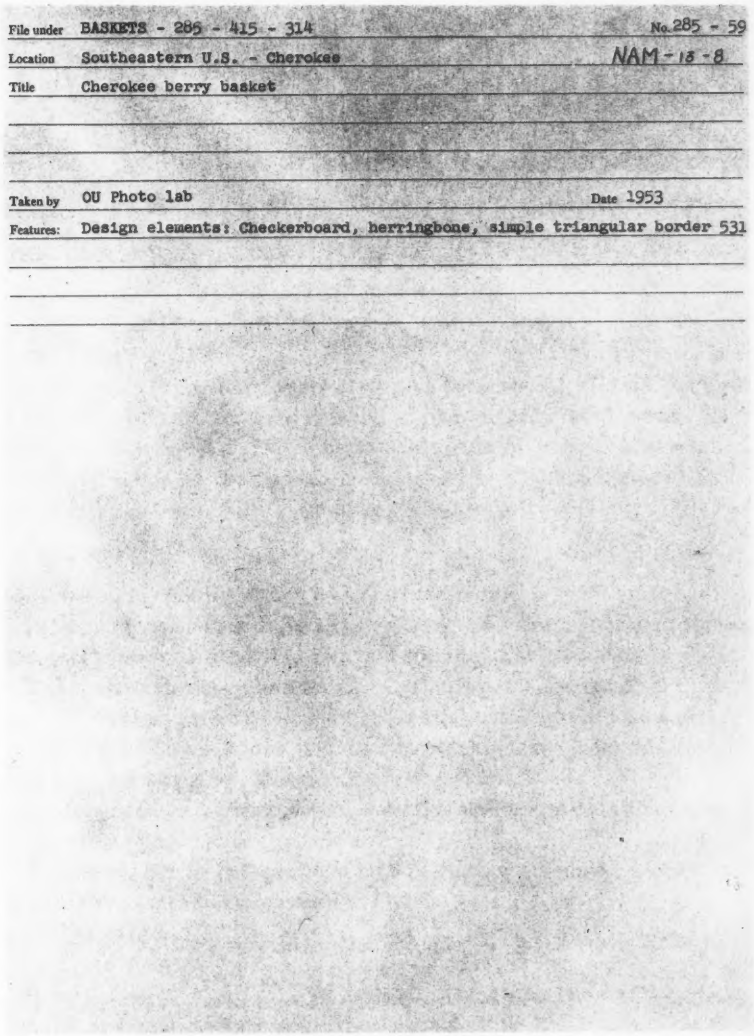

File under BASKETS - 285 - 415 - 314 No. 285 - 59
Location Southeastern U.S. - Cherokee NAM - 18 - 8
Title Cherokee berry basket
Taken by OU Photo lab Date 1953
Features: Design elements: Checkerboard, herringbone, simple triangular border 531

Fig. 6. Photo-file envelope sample. Filed under No. 285—Mats and Basketry. Cross-referenced also under numbers 415 (Utensils, Food containers), 314 (Forest Products—dye staff) and 531 (Decorative art).

file would be worse than useless; it would be cumbersome. We would, therefore, welcome any suggestions from other museums about modifications or adaptations of this or other cataloguing systems; workable suggestions for future modifications of the system will be incorporated in it whenever practicable. At the same time, we are ready to supply whatever additional information on the present system that we can work out to any museum that is interested in securing it.

The Embedding of Cleared, Biologic Specimens

B. SILLS, RESEARCH ASSOCIATE, EXHIBITION DEPT.
S. COUZYN, PREPARATOR, EXHIBITION DEPT.

The following is a description of the embedment of cleared, biologic specimens originally preserved in oil of wintergreen or glycerine. This method is now used at The American Museum of Natural History, and is a modification of the technique described by Captain Bernard Sills.[1]

Technique

A. Removal of clearing agent with Carbowax 600[2]

1. Remove specimen from clearing agent, let drain thoroughly, blot and gently press to remove as much of the liquid as possible.
2. Immerse specimen in a bath of Carbowax 600 and cover.
3. The average-sized specimen, i.e., a five- to six-month foetus, is kept in Carbowax 600 for a minimum of two weeks. Longer periods may be necessary for larger specimens.
4. Two or three changes of Carbowax 600 will insure complete removal of clearing agent.
5. A week before the specimen is to be further processed, place it and its Carbowax bath in an oven set at 50° C.

B. Removal of Carbowax 600 and infiltrating with Selectron 5026[3]

[1] Sills, Bernard, *The Mechanics of Plastic Embedding as Applied To Biologic Tissue*, Armed Forces Institute of Pathology, Washington, D.C.
[2] Carbowax 600 (Polyethylene Glycol #600) produced by Carbide & Carbon Chemical Company, N.Y.C.
[3] Selectron 5026 (Polyester Resin) produced by Pittsburgh Plate Glass Company, Pittsburgh 22, Pennsylvania.

1. Remove specimen from Carbowax bath, let excess drain, blot and gently press to remove as much Carbowax as possible.
2. Suspend specimen in oven for one hour at 90° C. Place pan under specimen and catch drippings.
3. Remove specimen, wash with acetone until all trace of wax is removed.
4. Remove specimen from acetone bath, shake off excess liquid and before any drying takes place, place specimen in uncatalyzed Selectron.
5. Keep specimen in Selectron until maximum clearing takes place.

C. Making the Mold

1. The length and width of the mold is optional. However, the depth should not be more than 1 mm. greater than the thickness of the specimen.
2. Make a frame of 1/8″ Plexiglas, the dimensions of which are determined by length, width, and depth of the specimen. (Fig. 1)
3. Cement base of frame to a sheet of Cellophane or Mylar[4] to make a mold.
4. Additional depth can be given to the mold by rimming with masking tape.

D. Embedding Specimen

1. Measure into a beaker the amount of Selectron necessary to fill the mold to a depth of 1 cm. and add catalyst.
2. Place specimen in mold and pour in catalyzed Selectron. (Fig. 2)
3. Inspect specimen frequently until the Selectron gels to make sure all bubbles and debris have been removed.
4. On the following day add another layer of Selectron. Repeat this process daily, until the entire specimen is covered with approximately 1 to 2 mm. of Selectron.

E. Surfacing and Finishing

1. Remove or strip away any masking tape so that the top of the block is flush with, or slightly above, the top of the frame.
2. Support the mold on a can or wooden block so that it is above the table.
3. Place a disposable pan under the support.
4. Rim the bottom of the mold with masking tape to form an apron.
5. Cut a sheet of Mylar slightly larger than the size of the block.
6. Pour on enough highly catalyzed Selectron to wet top surface.
7. Float Mylar sheet on the newly poured Selectron in the same way one would float a cover-slip on an histologic preparation, allowing excess Selectron to run down skirt into collecting pan below. (Fig. 3)
8. Make sure no bubbles are trapped beneath Mylar.

[4] Mylar (Polyester film) produced by E. I. Du Pont de Nemours and Company, Wilmington 98, Del.

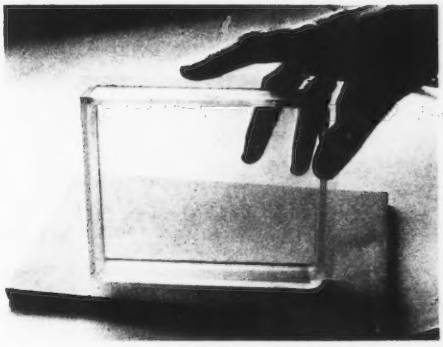


Fig. 1. Plexiglas frame with cemented Mylar base.

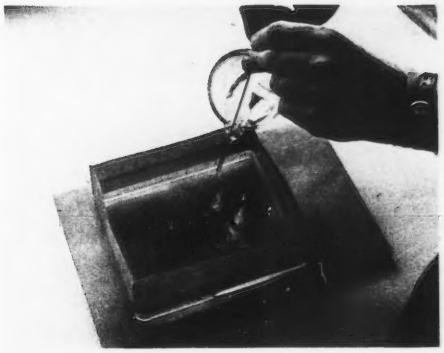


Fig. 2. Plexiglas mold being filled with Selectron. Additional depth is provided by masking tape.

Fig. 3. Mylar sheet being floated on newly poured Selectron surface.

Fig. 4. Specimens in pressure cookers.

9. Allow Selectron to set and turn block over.

10. Strip away Mylar or Cellophane floor and repeat from Section D, Step 4, inclusive.

Comments and Discussion

The following further clarifies some of the steps.

1. Carbowax 600 (Polyethylene Glycol) is a synthetic, water-soluble wax which is compatible with Selectron 5026, glycerine, and oil of wintergreen.

2. Due to the fact that Carbowax 600 is very hygroscopic, we keep our Carbowax baths tightly covered.

3. Minimum time for a specimen in Carbowax is two weeks. However, longer periods for larger specimens may be necessary. A specimen can remain in the bath for an indefinite period of time without deterioration, but there may be loss of clearing.

4. If we use a pressure cooker as the container for the bath and specimen, we employ positive and negative pressures in order to facilitate interchange between Carbowax and the clearing agent. (Fig. 4)

5. It is necessary to change the Carbowax bath one or more times in order to remove all traces of the clearing agent.

6. Heating the Carbowax-infiltrated specimen at approximately 90° C. for one hour reduces the viscosity of the Carbowax, thus facilitating removal from the specimen. This also drives off any traces of moisture picked up by the Carbowax.

7. The acetone bath removes any Carbowax still remaining within the specimen.

8. Acetone evaporates rapidly and can cause some drying if the specimen is not quickly put into Selectron.

9. Clearing and infiltration of the specimen with Selectron can be hastened by the use of positive and negative pressures. This also removes deeply trapped air.

10. The Plexiglas mold is cheap and disposable, and in our hands has proved to be easier to manipulate than conventional molds (glass, metal).

11. We generally use 1/8″ Plexiglas.[5] However, thinner stock can be used on small molds while heavier stock can be used on larger ones.

12. The frame can be made by cementing four sides of Plexiglas together. Another method is to heat the Plexiglas, bending a strip of adequate length into the desired shape and cementing the ends. We use Metheylene Cloride for cementing,[6] but chloroform can also be used.

13. Mylar or Cellophane makes a good floor for the mold and is

[5] Plexiglas (acrylic resin) produced by Rohm & Haas, Bristol, Pa.
[6] Metheylene Cloride obtained from Fisher Scientific Co., New York, N.Y.

readily cemented to the Plexiglas frame. This seal should be as perfect as possible in order to avoid leakage.

14. For the floor of the mold, thin 25A- to 100A-gauge Mylar can be used. For surfacing only, 750A-gauge Mylar is used, as it is the most rigid of the Mylars.

15. The finished mold is put on a glass or metal tray and the latter, rather than the mold, is handled. (Fig. 3)

16. We use tertiary-butyl-hydroperoxide[7] as our catalyst and do not use promoters, accelerators, or heat curing.

17. The amount of catalyst added is kept to a minimum and varies from 5 to 10 drops per hundred cubic centimeters of Selectron regardless of the volume of plastic that is being prepared. This gives us a gel time of about three hours, which allows time to remove debris and bubbles and to orient the specimen. It is advisable to check new batches of plastic for reactivity and to vary the number of drops of catalyst accordingly.

18. We do not sand our blocks. The Mylar floated on the final layer of Selectron easily strips away, leaving a hard smooth surface that requires no further finishing.

19. The frame of the block is sawed away and the cut sides are left unpolished. Thus it is unnecessary in our work to sand or buff.

[7] Tertiary-butyl-hydroperoxide produced by Lucidol Division, Wallace and Tiernan, Inc., Buffalo 5, New York.

Fig. 5. Completed embeddment of small intestine (block size 4¼" by 6½") and of foetus (block size 5½" by 8¼").

CURATOR BOOK REVIEWS

Erberto Carboni, Exhibitions and Displays. *With an introduction by Herbert Bayer. German, French, Italian, and English text. Silvana editoriale d'arte, Milano, 1957, 215 pp., 583 illustrations, $12.50*

This new Italian publication on exhibition design is concerned with the presentation of the work of one man, Erberto Carboni. Signor Carboni was trained as an architect, but gradually spread his interests and talents to encompass the fields of graphic arts, illustration, interior decoration, and exhibition design.

The many photographs of Carboni's exhibitions and displays covering the years from 1934 to 1955 are a document of an amazingly productive artist that should stimulate anyone who is actively engaged in museum administration or exhibition work, as well as those in the graphic arts.

Many of the elements in Carboni's designs may seem too rich or "advanced" for the average museum, but there are uses of structure in conjunction with typography and three-dimensional objects or products which should create a great deal of interest.

Carboni's particular contribution to exhibition design is his imaginative use of form, line, and colorful spatial arrangements. The originality for which Carboni is noted is based on an analytical working process. Since every project has specific preconditions, limitations, dimensions, and character, new forms must evolve in each instance.

For a picture book which covers over twenty years of a designer's work, there is little repetition and few examples of "window display" designing. Generally, each project seems to

have its own vitality and originality. "Exhibitions and Displays" is a valuable addition to the too-skimpy literature of present-day exhibition design. This new publication, with its veritable treasury of 583 illustrations, will be looked at with equal enjoyment and stimulation by designers and museum administrators.

L. P. W.

Museum Workers Notebook. *Charles J. Long, Witte Museum, 1957, Brackenridge Park, San Antonio 9, Texas.*

This book is an admirable attempt to cover a multitude of techniques, methods, materials, and product sources used by the museum artist and technician. Unfortunately, many of the techniques described are a little out of date and quite costly compared to some of the newer methods. Mr. Long should have consulted one of the larger museums in this country before undertaking this project. I am sure his project would have been well received and the final Notebook would have gained in stature and usefulness. Recommending untried techniques can be costly and dangerous to the unskilled worker. To me, this was perhaps the greatest fault of the Notebook.

A grave omission is the entire new philosophy with regard to overall contemporary exhibit design. There are at least two United States periodicals, especially *Interiors* and *Industrial Design* magazines, plus numerous Italian, Swiss, and German publications that deal with contemporary design and new exhibition methods, including architecture, lighting, case design, and the graphic arts.

Mr. Long has nevertheless incorporated under one cover many useful items that do make the Notebook a valuable addition to the general bibliography of museum methods.

L. P. W.

Ausstellungsstande *(Exhibition Stands). Robert Gutmann and Alexander Koch. German, French, and English text. Alexander Koch GMBH Stuttgart, 1954, 248 pp., 336 illus., $12.50*

This book is a competent and balanced visual review of exhibition stands, installations, traveling exhibitions, pavilions, and exhibition graphic arts of almost world-wide coverage. The authors, by presenting this photographic survey, propose to inspire those who are concerned with the improvement of exhibition standards.

The high quality of international exhibition design is made quite vivid by over 300 beautiful photographs of every conceivable kind of display.

An international survey by seven leading designers helps set the scene for the photographs which follow. Unfortunately, the written commentaries by these experts lack specifics which might enable the reader to get a more thorough background on the recent developments in Europe. The captions which accompany the photographs are also quite brief and could have been expanded upon.

Whatever shortcomings the written text might have, the photographs more than make up for this deficiency. Every museum director and museum exhibition specialist should not fail to study this book if he is at all interested in visual communication.

L. P. W.

LETTERS TO THE EDITOR

The first issue of CURATOR has just reached me. I have gone through it rapidly, reading a bit here and there and looking at the pictures. I look forward to reading every word of it at an early moment.

I can appreciate the magazine enough, even in this hasty overview, to realize its excellence both from the point of view of subject matter and typography. Let me congratulate your whole Editorial Board and let me say how grateful the American Association of Museums is to The American Museum of Natural History for undertaking this useful and thrilling publication.

My deepest best wishes go with you in this fine work.

Edward P. Alexander, President
The American Association of Museums

I have recently had the pleasure of reading the first issue of CURATOR, and I wish to congratulate you on the concept of this publication as well as the excellent appearance of the first number. I am going to anticipate future numbers of this periodical with the greatest interest.

A. C. Smith, Program Director for
Systematic Biology
National Science Foundation

Please accept congratulations on CURATOR, first copy of which I received this morning. This gives every promise of being a highly valuable as well as interesting publication and I hope its career may have great success.

Fairfield Osborn, President
New York Zoological Society

Please let me congratulate you on your new quarterly, CURATOR. Anyone who has deep interest in The American Museum of Natural History can gain much from reading this magazine.

Richard C. Patterson, Jr., Commissioner
Department of Commerce and Public Events
The City of New York

My heartiest congratulations to all co-editors of CURATOR, a very handsomely produced periodical and such fun to read. . . .

Karl Kup, Chief of Art and
Prints Divisions and Spencer Collection
The New York Public Library

Congratulations to you and the Museum on your splendid new quarterly magazine, CURATOR. I know this fine addition to scholarly publications will be of great assistance and interest to museum professionals throughout the world.

Thomas Vaughan, Director
Oregon Historical Society

Just a hasty note to congratulate you and the staff of the AMNH upon the first issue of CURATOR! A much-needed and highly welcomed publication in the museum field.

Stephan F. deBorhegyi, Museum Director
Stovall Museum of Science and History
University of Oklahoma

I just want you to know how delighted I am about your new publication CURATOR. We all in the museums' profession are indebted to you for getting this publication started, and I am sure it will be a great impact in American museums' activities for the years to come.

Bruno Gebhard, Director
The Cleveland Health Museum

My warmest congratulations on CURATOR, which I have just read from cover to cover. It strikes me as an absolutely first-rate job and it will, inevitably, have a tremendous influence on the whole museum field. All of the articles are good and the format is excellent. I don't see how this first issue could be improved upon, and I shall certainly look forward to seeing future issues.

H. M. Wormington, Curator of Archaeology
Denver Museum of Natural History

My compliments to you and the officials and staff of The American Museum of Natural History are expressed in the enclosed item I have prepared for use in our museum journal, *El Palacio*. I very much appreciate having received the first issue of CURATOR and I have asked our Library to forward a subscription order promptly. With all best wishes for the success of your new journal, I am,

Wayne L. Mauzy, Director
Museum of New Mexico

I have just now written a memorandum to our museum library stating that we must have a special charter subscription to CURATOR. I am sure that such letters and requests are presenting themselves daily. For us at the Toledo Museum of Art each article was of value, if not directly at least indirectly. It seems to me that it is most important to be reminded at all

times to keep standards and approaches up . . . certainly those who read future issues of CURATOR will be aided in doing just that. Also I would not worry about presenting articles with too much detail . . . it is exactly that which is needed. It seems to me that we all have a general creed covering our activities; what is needed is more attention given to the little things which go to make up a more perfect whole. Again, congratulations on CURATOR.

Richard Gregg
The Toledo Museum of Art

CURATOR is stunning and as good as it looks. We all are so delighted to have a publication in this country of which we as professional people can be proud, and to which we can turn for reliable assistance, that I cannot begin to express my appreciation for the job which underlies this first issue. . . . I might say that we all recommend subscriptions and I know of at least three which will come from this building. I hope eventually every member of the professional staff will feel it imperative to subscribe.

Please accept our congratulations and good wishes . . . I hope you will extend our appreciation to . . . all the members of the editorial board.

Margaret M. Brayton, Director
Children's Museum
Detroit Public Schools

Congratulations on a very auspicious beginning for CURATOR. The journal is impressive looking and attractive. As you already know, I think the American Museum and yourself are to be congratulated for providing this effective service to the museum profession. You have been successful in assembling a number of good manuscripts and have provided me (and I am sure many others) a stimulus to send material to you.

Arnold B. Grobman, Director
Florida State Museum

PICTURE CREDITS
Page 35, Lee Boltin; page 40, WTMJ-TV, Milwaukee; pages 89 to 91, Lothar P. Witteborg; all others, The American Museum of Natural History.